U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT
BUTTE FALLS RESOURCE AREA

ENVIRONMENTAL ASSESSMENT FOR LOWER BIG BUTTE

Project Name/Number: OR-110-016

Project Location: T34S, R1E, sections 3, 9, 10, 11, 14, 15, 17, 21, 25, 33, & 35; T34S, R2E, sections 8, 9, 16, 17, 18, 19, 20, 21, 23, 28, 29, 31, 33, 34, & 35; T35S, R1E, sections 1, 3, 10, 11, 12, & 13; T35S, R2E, sections 7, 17, 18, & 19; Willamette Meridian, Jackson County, Oregon

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

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Butte Falls Field Manager

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Date_____

The Environmental Assessment was made available for public review in March 2002.

APPENDICES

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INTRODUCTION

The Butte Falls Resource Area (BFRA) proposes to implement forest management activities and restoration projects in the Big Butte Creek Watershed. The total analysis area is 43,817 acres in size. The BLM manages 14,030 acres (32 percent) of the analysis area; the remaining 29,787 acres (68 percent) are private lands. All timber harvesting would occur within Matrix and Administratively Withdrawn lands. Fuels Treatments, road projects, riparian thinning, vegetative restoration which include oak woodlands, grasslands and the Poverty Flat Area of Environmental Concern (ACEC), and pump chance renovation occur within Matrix, Riparian Reserves, and Administratively Withdrawn lands as defined in the Record of Decision for the Northwest Forest Plan Environmental Impact Statement (SEIS/ROD) p 7. All projects are located on public lands administered by the BLM. (See map 1 for project location.)

I. PURPOSE OF AND NEED FOR ACTION

The purpose of the Environmental Assessment (EA) is to analyze the effects of harvesting timber, reducing fuel hazards to meet the National Fire Plan (e.g., handpile and burn, slash busting with a rotary head chipper, and underburn), road related projects (e.g., road upgrades, road closures), riparian thinning, vegetative restoration which include oak woodlands, grasslands and the Poverty Flat ACEC, and pump chance renovation from this analysis area. The proposed timber harvest on Matrix lands would contribute to the District's decadal Probable Sale Quantity (PSQ).

The goals and objectives set forth in the Medford District Resource Management Plan (RMP), to create a shift in vegetative condition. This provides for management recommendations to improve forest vigor, non-forest vegetative conditions, soil productivity, wildlife habitat and aquatic habitat have been developed in the Lower Big Butte Watershed Analysis (see Table 1). These recommendations have been incorporated into project proposals presented in this EA.

This environmental assessment (EA) is being prepared to determine if the proposed action and any of the alternatives would have a significant effect on the human environment, thus requiring the preparation of an Environmental Impact Statement (EIS) as prescribed in the National Environmental Policy Act of 1969. It is also being used to inform interested parties of the anticipated impacts and provide them with an opportunity to comment on the various alternatives. Further, the EA is being used to arrive at a final project design to meet a variety of resource issues.

Finally, the EA is also being used to provide the decision maker, the Butte Falls Resource Area Field Manager, the most current information relating to these projects upon which to base a decision.

Vegetation Management
The objectives for forest management include producing a sustainable supply of the timber resource as well as other forest products. Additional goals include restoring the vigor, resiliency, and stability of forest stands by reducing the risk of losses from wildfires, animals, insects and diseases. On Administratively Withdrawn lands, management objectives are specifically intended to provide for forest health and other resource values which include enhancement of wildlife habitat, riparian habitat and/or fuel hazard reduction. (Medford District's Resource Management Plan pgs 38, 62 & 72).

Many forested stands in the watershed are in need of treatment, the conditions vary; some stands have more trees than the site can sustain, while other stands are declining in vigor due to changes in stand composition and structure. These stands are at higher risk of mortality from insects, disease or wildfire. Without treatment, the long term stability of forested lands and their resiliency to disturbance would remain at an undesirable level. In oak woodlands, brush lands and grasslands, encroachment of conifers and non-native vegetation has resulted in reduced hardwood vigor, lower wildlife forage palatability, and increased fire risks.

Poverty Flat ACEC
Poverty Flats ACEC is located along the Butte Falls Highway and is increasingly dominated by invasion of non-native plants and noxious weeds. Approximately 10 acres of the 29 acre ACEC would be treated with prescribed fire in late summer, fall or winter, after senescence of Meadow foam species.

The objective of the project is to reintroduce fire into the natural meadow/white oak grasslands ecosystem where fire has not occurred in the recent past. A prescribed fire would reduce the amount of the non-native weed seed component in the soil and cured grass and forb biomass. The fire frequency cycle within the ACEC has been interrupted by management activities, which has allowed non-native species to invade and dominate the meadow eco-system. The disturbance would create openings where native grass and forbs can reestablish through natural dispersion methods of existing plants occupying the site or by artificial seeding of native grass types associated with the community. Prescribed fire would provide for an influx of nutrients that would enhance the vigor of existing native grasses and forbs.

Fuel Hazard Reduction
Of the 43,817 acres within the watershed approximately 35,500 acres are in a high intensity fire hazard classification. The BLM manages approximately 14,030 acres of which 11,500 acres are classified as high intensity fire risk. A portion of this watershed is classed as rural interface with a number of rural residences adjacent to BLM managed land. The primary vegetative structure contributing to fire risk is the development of a vertical fuel component in brush fields, woodlands and conifer stands.

Pump Chance Repair- T.35S. R. 2E. section 19

Pump chance (constructed pond for fire protection uses) currently does not hold water. Repairs would be to clean sediment out of pump chance, remove encroaching vegetation and reset the overflow pipe. Excavated material would be end-hauled to a site outside of the Riparian Reserve designated by the Authorized Officer.

Aquatic Habitat & Roads

The Lower Big Butte Watershed Analysis (LLB WA) pg 34 has shown that the cumulative effect of sedimentation from roads in the watershed is an issue of concern. Roads that are not properly maintained or that are not adequately surfaced are particularly prone to erosion and subsequent sedimentation of nearby streams. Roads that are not needed for access either in the long term or short term, should be considered for decommissioning to aid in reducing road related sedimentation. Decommissioning of roads, is also one of the methods the Northwest Forest Plan (NFP) recommends to help meet Aquatic Conservation Strategy (ACS) objectives.

Table 1. Project Objectives

● Promote stand and forest health as it relates to increasing the vigor of forest stands and reducing the risk of mortality from insects, disease and wildfire (Lower Big Butte Watershed Analysis pg 52, Medford District RMP pg 62).

● Implement vegetative treatment practices in early-seral stands that would lead to the development of late-seral stand conditions (Lower Big Butte Watershed Analysis pg 52).

● Implement vegetative treatment practices to promote and develop late-seral conditions and reduce fire risk in riparian areas (Lower Big Butte Watershed Analysis pg 52).

● Implement fuel hazard reduction activities to lower fire risks within the watershed (Lower Big Butte Watershed Analysis pg 52).

● Maintain or enhance current native terrestrial wildlife populations and distribution (Lower Big Butte Watershed Analysis pg 53).

● Maintain or improve the natural function of the native grass/oak woodland plant associations (Lower Big Butte Watershed Analysis pg 53).

● Reduce sedimentation of stream substrate (Lower Big Butte Watershed Analysis pg 55).

● Restore and maintain soil productivity (Lower Big Butte Watershed Analysis pg 58).

● Develop opportunities for Special Forest Products (Lower Big Butte Watershed Analysis pg 60).

● Design projects to maintain VRM II characteristics along Cobleigh Road (Lower Big Butte Watershed Analysis pg 60).

● Maintain and protect BLM Special Status, Threatened and Endangered, and Survey and Manage plant and fungi populations.(Lower Big Butte Watershed Analysis pg 52)

● Prescribed burn of ACEC to reduce encroachment and density of non-native weeds and stimulate vigor of native plant community. (Lower Big Butte Analysis pgs 52-54)

A. Conformance With Existing Land Use Plans

The proposed timber harvest and restoration projects are in conformance with the BLM land use plans for the subject areas. The proposed treatments are consistent with management objectives and silvicultural systems for the public lands identified in the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (SEIS), approved April 13, 1994, the *Record of Decision and Resource Management Plan for the Medford District* (RMP), approved June 1995, the *Record of Decision and Standard and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standard and Guidelines*, (S&M ROD), approved January 2001 and *Managing the Impact of Wildfires on the Communities and the Environment*, (USDA, USDI 2000).

All of the acreage (5,330 acres) proposed for treatment has been identified as Matrix, Riparian Reserve, or Administratively Withdrawn lands. As defined in the SEIS (pg C-39) and the RMP (pgs 38-40), Matrix lands consist of those federal lands outside of the six categories of designated reserve areas in which most timber harvest would be conducted according to standards and guidelines. Administratively Withdrawn lands as defined in the SEIS (pg C-29) and the RMP (pg 72) are those lands unavailable for planned forest management such as woodlands, riparian reserves, TPCC withdrawn lands, etc. Within Administratively Withdrawn acres, timber harvest would occur only as part of strategies to enhance other resources such as riparian habitat, wildlife habitat, or management of special areas. Harvest of these lands, if they occur, are not included in the Allowable Sale Quantity (ASQ). The Environmental Impact Statements (EISs) prepared in conjunction with the SEIS and the RMP included analysis of this land use allocation. Unless site-specific inventory or analysis determines timber harvesting is not suitable based on the existence of resource values (e.g., cultural resources, habitat for threatened and endangered species), this document would not readdress the suitability of Matrix and Administratively Withdrawn lands for timber harvesting, but rather the appropriate intensity and method of harvesting and conformance of the proposed harvesting within the standards and guidelines.

B. Relationship to Statutes, Regulations, and Other Plans

The proposed action and alternatives are in conformance with the direction given for the management of public lands in the Medford District by the Oregon and California Lands Act of 1937 (O&C Act) and the Federal Land Policy and Management Act of 1976 (FLPMA). The BLM is directed to manage the lands covered under the O&C Act for permanent forest production under the principles of sustained yield. BLM is also required to comply with other environmental and conservation laws, such as the Endangered Species Act of 1973 and the Water Pollution Prevention and Control Act, while implementing the mandates given by FLPMA and the O&C Act. The proposed action and alternatives are in conformance with these laws.

C. Decisions to be Made Based on the Analysis

The Butte Falls Resource Area Field Manager must decide if the impacts of implementing the proposed action or the alternatives would result in significant effects to the human environment, thus requiring that an EIS be prepared before proceeding with the proposed action as prescribed in

the National Environmental Policy Act of 1969.

The field manager must decide if the BLM would harvest trees, close roads, conduct fuel treatments on Matrix and Riparian Reserves, restore oak woodlands and meadows, thin in the riparian reserve, remove a culvert for fish passage, conduct prescribed burn within ACEC, and restore a failing pump chance.

If the decision maker should decide to select one of the action alternatives, the analysis in this EA would be used to help determine where timber harvesting and restoration treatments could occur.

D. Summary of Public Scoping Activities

Scoping letters were sent to adjacent landowners and to the interested public. The letter requested comments concerning issues that could be addressed in the Environmental Assessment. In addition, two public meetings were held to gather and disseminate information on the proposed projects. Responses received are on file in the Butte Falls Resource Area, Medford District BLM. Following is a list of issues and/or concerns that were received:

- ★ Consider creating fuel breaks adjacent to property lines, rather than treating fuels across a given piece of BLM land.
- ★ Concern of prescribed burning and its potential effect on song birds.
- ★ What is the effect of prescribed burning on VRM?
- ★ The "old growth" patch in T34S, R2E, sec. 25 should be retained, due to the concern that the harvest would alter the local climatic conditions.
- ★ In favor of treating brush to reduce fire risk.
- ★ Cumulative effects; are activities on private lands taken into consideration?
- ★ Concern of prescribed burning activity near homes.
- ★ Is BLM cutting old growth only?
- ★ Road closures that would prevent access for fire.
- ★ Avoid timber harvest and road building in areas that are roadless.
- ★ Avoid harvest of late-seral forests.

E. Issues

1. Issues Considered But Not Analyzed in Detail

Many issues were discussed during the interdisciplinary team (IDT) meetings for these proposals.

After discussing the issues, the IDT determined that while these issues and concerns were real, many were outside the scope of the EA and others were not major issues for this proposal that would affect the human environment. For a more in depth discussion of these issues see Appendices. Soils is an issue that is included in the appendices.

Pre-project Inventories/Surveys

a) Cultural resources--locations would be protected. (Appendix A)

b) Wildlife - T&E–Northern spotted owl designated 100 acre activity centers would not be entered. Appropriate seasonal restrictions would be implemented.
Survey & Manage species–surveys were completed to inter-agency current protocols and appropriate management guidelines were applied. (Appendix C)

c) Visual Resources Management (VRM)--meets RMP VRM standards

d) Mining--no active mining claims in the area

e) Road Closures (Appendix D)

f) Special Status Plant Surveys - Federally listed Threatened & Endangered, State listed Threatened and Endangered Species, Bureau Sensitive Species, and Survey and Manage Species. All project areas have been surveyed for Special Status plants except for non-vascular plants surveys on fuels treatment areas. These areas are scheduled for completion during the spring of 2002. Special Status Plant surveys were completed to current inter-agency protocol and appropriate conservation guidelines were applied (Appendix B).
Determination of Effects - The BLM finds that the proposed action has "no effect" to *Fritillaria gentneri* or its habitat provided the project is carried out with the designed conservation measures.

g) Riparian Surveys–Completed on all intermittent and perennial streams in 1999.

h) Fish presence and absence surveys were conducted in 1999.

2. Issues Identified To Be Analyzed In This EA

The issues identified through the initial scoping effort and through the interdisciplinary team process are listed in Table 2. Indicators or measurements are suggested that may be used to compare how the alternatives address the issues. Chapter II contains a comparison summary of the alternatives and their response to the issues.

Table 2. ISSUES TO BE ANALYZED IN DETAIL

Issue 1: Vegetation

Dense Forest Stands and Declining Stand and Tree Vigor

The stands proposed for thinning and selective harvest have more trees than the site can sustain. Removal of competing and low vigor trees would reduce competition and provide additional site resources (nutrients, water, sunlight) for the remaining trees. The stands proposed for regeneration harvest are deteriorating or with overstory growth being offset by mortality; these conditions are threatening the integrity of the stand. High densities and deterioration of older stands result in declining tree vigor and growth, tree mortality, and an increased susceptibility to insect attack, root disease infection, and fire.

Indicators for measuring this issue are:

- Acres receiving silvicultural treatment
- Change in the number/density of trees per acre
- Change in growth of timber stands after treatment

Native Grasslands and Oak Woodlands

Declining oak woodlands and grasslands

Indicators for measuring this issue are:

- Acres of woodland treatment
- Acres of brush field treatment
- Acres of grassland treatment
- Acres of grassland/brushfields and woodlands seeded with native seed

Issue 2: Fuels Hazard Reduction

There currently exists high fuels buildup and an increasing probability of large or stand replacement fires.

Indicators for measuring this issue are:

- Acres treated
- Acres treated within Rural Interface Zones
- Change in fuel model (see Fuel Modeling Graph)
- Reduction in flame lengths and fire intensities (see writeup Table 4)

Issue 3: Hydrology/Water quality

Stream Sedimentation

Indicators for measuring this issue are:

- Miles of road renovated
- Miles of road improved
- Miles of road decommissioned and/or full decommission

Issue 4: Aquatic Habitat/Fisheries

Riparian Health

Indicators for measuring this issue are:

- Acres thinned within Riparian Reserves
- Miles of road decommissioned within Riparian Reserve

Fish Passage Barriers

Indicators for measuring this issue are:

- Number of barriers removed on fish-bearing streams

Issue 5: Wildlife Habitat

Indicators for measuring this issue are:

-Deer and Elk forage

-Loss of Northern spotted owl habitat

I. ALTERNATIVES INCLUDING THE PROPOSED ACTION

A. Introduction

The Butte Falls Resource Area has developed three action alternatives to achieve the project objectives identified in the Lower Big Butte Watershed Analysis (pgs 52-60). After receiving comments from the public through the scoping process, the alternatives were developed by a team of resource specialists. The Lower Big Butte Watershed Analysis provided information that was used in the development of these alternatives.

This chapter describes the alternatives. The action alternatives are described by the issue and how the alternative would affect the key issues. **Table 3 is a comparison summary of the alternatives.**

In this chapter you will find:

A description of the no-action alternative;
A description of the features common to all action alternatives;
A description of each action alternative;
A comparison of how each alternative affects the major issues listed in Chapter I.

B. Alternatives Considered But Eliminated

Alternative four was considered but eliminated from detailed analysis, because the proposals identified for this alternative were incorporated into action Alternatives 2 or 3. The level at which issues are addressed by this alternative, are adequately covered by the existing action alternatives (See Appendix K.).

TABLE 3: SUMMARY DESCRIPTION OF THE ALTERNATIVES

Action	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 5
Vegetation Management including Fuel Hazard Reduction: 1/				
Estimated Volume	0 MBF	8.2 MMBF	5.2 MMBF	2.1 MMBF
* **Acres by treatment type**				
commercial thin/density management	0 acres	655 acres	745 acres	430 acres
understory thin/conifer stands	0 acres	1180 acres	1180 acres	1270 acres
selective cut	0 acres	135 acres	135 acres	0 acres
regeneration harvest	0 acres	220 acres	30 acres	0 acres
hardwood conversion	0 acres	50 acres	0 acres	0 acres
underburn/conifer stands	0 acres	170 acres	180 acres	180 acres
Oak woodland restoration	0 acres	1530 acres	1530 acres	1530 acres
Brush reduction	0 acres	980 acres	980 acres	980 acres
grassland/meadow restoration	0 acres	410 acres	410 acres	410 acres
***Acres by logging or treatment method**				
Tractor	0 acres	540 acres	430 acres	185 acres
Cable	0 acres	170 acres	70 acres	15 acres
Helicopter	0 acres	360 acres	370 acres	250 acres
Rotary Head Chipper (slash buster)	0 acres	1860 acres	1860 acres	1890 acres
Low ground pressure (ATV)	0 acres	0 acres	60 acres	80 acres
Hand cutting or burning	0 acres	2340 acres	2340 acres	2380 acres
1/ Includes vegetative treatments in Riparian Reserves and ACEC.				
Roads				
Road Projects:				
Miles of roads improved	0 miles	8 miles	8 miles	8 miles
Miles of roads renovated	0 miles	36 miles	36 miles	29 miles
New permanent road construction	0 miles	1 mile	0..3 miles	0.07 miles
New Temporary road construction	0 miles	2..5 miles	0.7 miles	0 miles
Road closure:				
Seasonal/Temporary	0 miles	20 miles	20 miles	20 miles
Full Decommission	0 miles	3.4 miles	3.4 miles	3.4 miles
Decommission	0 miles	2 miles	2 miles	2 miles
Pump Chance Improved	0	1	1	1

Action	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 5
Water Quality and Fisheries				0
Mi. of Full Decommission in Rip.	0 miles	0.4 miles	0.4 miles	0.4 miles
Mi. of Part. Decommission in Rip	0 miles	0.5 miles	0.5 miles	0.5 miles
Miles of rds improved in Riparian	0 miles	1.6 miles	1.6 miles	1.6 miles
Miles of rds renovated in Riparian	0 miles	5 miles	5 miles	5 miles
Mi. Temp blocks in Riparian Res.	0 miles	4 miles	4 miles	4 miles
Number of barriers removed	0	2	2	2
Ac. treated within Riparian Reserves	0	70	70	70

C. Alternatives Examined in Detail

1. ALTERNATIVE 1--No Action

Analysis of this alternative provides a baseline against which the effects of the action alternative can be compared. For this EA, the No Action Alternative is defined as no vegetation management including fuel hazard reduction, no road renovation or closures, no fish passage improvement, or pump chance repair. Prescribed fire would not occur in the ACEC. The current trend in increasing weed invasion, expansion and dominance would continue. Native grasses and forbs which are adapted to and respond positively to periodic fire would continue to decline in vigor and abundance. The resource values identified for creation of the ACEC would diminish. Bureau sensitive species may lose habitat to more vigorous non-native invaders.

2. ALTERNATIVE 2

The intent of this alternative is to achieve the goals, objectives, and desired future condition for the timber stands as specified in the Northwest Forest Plan and the Medford District Resource Management Plan. On Matrix lands, emphasis is placed on maximizing commodity production of the timber resource. On non-forest lands and lands Administratively Withdrawn, management emphasis is placed on treatment of forested stands, restoration of oak woodlands, and/or hazard fuels reduction. This alternative includes the projects described below:

2a) Vegetation management including Fuel Hazard Reduction Activities (See Alternative 2 Map and Fuels Hazard Reduction Map for project location).

The overall scope of this action alternative covers approximately 5,330 acres. This includes 1,580 acres of BLM managed lands designated Matrix and 3,750 acres of lands classified as Administratively Withdrawn from timber production. Matrix lands include Southern General Forest Management Areas, Northern General Forest Management Areas and Connectivity/Diversity Blocks. Administratively Withdrawn lands consist of approximately 830 acres which are conifer forest types and 1,530 acres of oak woodland forest types. An additional 1,390 acres of non-forested brush fields and grasslands have been identified for fuel reduction treatments or restoration of native grasses. This action consists of ten general treatment methods:

1. Commercial thinning/Density management of 660 acres where individual small trees and remnant mature overstory trees declining in vigor are removed from dense stands in order to redistribute growth to vigorous dominant and co-dominant trees. Canopy closure of 40 - 60% would be retained on Matrix lands available for commercial harvest (630 acres). On Administratively Withdrawn lands (30 acres), densities would be reduced to eliminate ladder fuels and crown closures to a level where crown fire cannot be sustained (approximately 60% canopy closure).

2. Understory reduction of 1,710 acres where shrubs and smaller individual trees (generally 8 inch dbh or less) are removed from dense conifer stands or oak woodlands. In site specific cases, individual trees up to 14 inches dbh may be removed to provide for release of pine species or larger remnant hardwoods. Treatments would reduce crown fire potential through removal of ladder fuels as well as enhance growth in younger stands. Treatment includes 510 acres of Matrix

lands and 1,200 acres of Administratively Withdrawn lands. Canopy closure would be approximately 60% following treatment, except in oak woodland inclusions where variable stocking levels may currently have less than 60% canopy closure.

3. Selection cutting of 130 acres would remove individual or small groups of trees from all diameter classes. Stand densities would be reduced, releasing site resources (water and nutrients) for the remaining trees. A 40% canopy closure would be retained. Planting of conifer seedlings would occur in poorly stocked areas following harvest. This treatment method would occur on Matrix lands only.

4. Structural retention regeneration harvest of 150 acres, retaining 16-25 trees per acre greater than 20 inches dbh (South General Forest Management Area, (SGFMA). Exceptionally vigorous understory trees free of insects, disease, or damage would be retained. All other trees would be removed resulting in residual canopy closure of 25-40%. Planting of conifer seedlings would occur following harvest. This treatment method would occur on Matrix lands only.

5. Shelterwood retention regeneration harvest of 10 acres, retaining 12-25 trees per acre greater than 20 inches dbh. Exceptionally vigorous understory trees free of insects, disease, or damage would be retained. Residual canopy closure would be 20-40%. Planting of conifer seedlings would occur following harvest. This treatment method would occur on Matrix lands only.

6. Modified even-aged regeneration harvest of 60 acres, retaining 6-8 trees per acre greater than 20 inches dbh (Northern General Forest Management Area (NGFMA). Exceptionally vigorous understory trees free of insects, disease, or damage would be retained. Canopy closure would be 10-15%. Planting of conifer seedlings would occur following harvest. This treatment method would occur on Matrix lands only.

7. Hardwood conversion of 50 acres. Competing hardwood trees are removed in order to promote additional establishment of conifers and redistribute growth to existing dominant and co-dominant conifers. Depending on the site, all hardwoods less than 12 inches or 14 inches would be removed. The residual canopy closure would be 25 to 40%. Planting of conifer seedlings would occur following harvest. This treatment method would occur on Matrix lands only.

8. Underburning of 410 acres of conifer and woodland areas. Understory vegetation and surface fuels would be reduced. Approximately 40 acres of Matrix lands and 370 acres of Administratively Withdrawn lands would be treated.

9. Brush reduction treatments on approximately 980 acres of non-forest chaparral vegetative communities and 760 acres of oak woodlands dominated by buckbrush (*Ceanothus cuneatus*), deerbrush (*Ceanothus integerrimus*) and manzanita (*Arctostaphylos viscida*). Approximately two-thirds of the existing brush component would be removed mechanically or by hand to reduce fire intensity levels, improve forage palatability for wildlife, and maintain existing overstory hardwood and scattered conifer components.

10. Grassland burning of 410 acres to improve forage values for wildlife, as well as, restore this vegetative community to a condition less influenced by non-native species. Treatments would

occur in early spring or late fall. Seeding of native endemics would occur following treatment.

2b) Roads

Permanent Road Construction - 1.0 mile of permanent new road would be constructed.

Operator Spur Construction - Fourteen operator spurs are needed for access. After harvesting, the spurs would be fully decommissioned.

Road Renovation - This consists of work to be performed on the road prior to its use. The work includes, but is not limited to, blading the road surface, ditching, cleaning or enlarging catch basins, flushing corrugated metal pipes (CMP), cleaning and removing brush near the inlet or outlet of pipes, cleaning inlet and outlet end of pipes, and removing brush, limbs, and trees along the roadway to improve sight distance, and allow for proper road maintenance. All drainage structures, including culverts, water dips, and ditch relief outlets, shall have the necessary work performed to assure that water flow is not impeded. These actions would occur on approximately 36 miles of road.

Road Improvement - The objective of road improvement is to upgrade existing roads to reduce erosion and sediment deposits into streams. These actions would include improving or adding new drainage and/or surfacing on approximately 8 miles of road.

Road and Landing Decommissioning - These actions would be based on resource protection goals identified in watershed analysis and the RMP directives. The road, or a segment of the road would be closed to vehicles on a long-term basis but may be used again in the future. Prior to closure, the road would be prepared to avoid future maintenance needs; the road would be left in an "erosion-resistant" condition by establishing self maintaining drainage structures. Exposed soils would be re-vegetated by seeding with native grasses and/or planting conifers to reduce sedimentation. The road would be closed with an earthen barrier or equivalent. These actions would occur on approximately 2.0 miles of road.

Road and Landing Full Decommissioning - Roads that were determined through an interdisciplinary process to have no future need would be subsoiled (or ripped), seeded, mulched, fertilized, and planted to reestablish vegetation. Cross drains, fills in stream channels, and potentially unstable fill areas would be removed to restore natural hydrologic flow. The road would be closed with an earthen barrier or equivalent. The road would not require future maintenance. These actions would occur on approximately 3.4 miles of road.

Constructed Helicopter Landing Decommissioning - Eleven helicopter landings have been identified to be used for the proposed harvesting activities. These landings have been identified on BLM and private land. A number of these landings are in openings such as existing landings or road junctions and will require minimal construction or additional site disturbance to provide for safe landing activities. The remaining landings which are on BLM land will be constructed but would be decommissioned following completion of logging activities. Decommission would include ripping, seeding with native grasses and mulching. All landings would be less than 1 acre in size.

2c) Water Quality and Fisheries

Culvert Removal/Road Decommissioning in Clark Creek, T. 34S. R. 2E. Section 9
An unnumbered jeep road currently exists between Road #s 34-2E-9.3 and 34-2E-7. The road is a tie road that connects the two existing BLM roads and crosses Clark Creek. The road is being used as a short-cut to access the opposite side of the creek, but has no useful purpose as there are crossings located a short distance away which could be used just as easily. A culvert which contains the flow of the main stem of Clark Creek has been smashed down to the point that it restricts flows and impedes passage of resident cutthroat trout. The culvert would be removed and approximately 1/4 mile of road would be fully decommissioned. The natural stream bank contours would be restored and the road would be ripped, seeded, and planted with native riparian and conifer species. The road would be permanently blocked with boulders or a log/earth barricade.

Log Stringer Bridge Removal/Road Decommissioning in Clark Creek, T. 34S. R. 2E. Section 14
A log stringer bridge on Road # 34-2E-14.1 located on private timber lands has been identified as being in need of removal. The bridge crosses the South Fork of Clark Creek and is so badly deteriorated that it does not adequately pass flows. The stream flows over the road at several places, creating a sedimentation problem in the stream channel. This project would remove the log stringer bridge and partially decommission approximately 0.5 miles of the road. The road would be left in an erosion-resistant condition by adding drainage structures where needed and seeding with native grasses. The road would be temporarily blocked with a gate, an earthen barrier, or other appropriate device. Although this road is planned for long-term closure, it accesses private lands so there is the possibility that it may be used again in the future.

Overflow Armoring in Clark Creek, T. 34S. R. 2E. Section 9
A stream crossing on Clark Creek at Road # 34-2E-9.2 periodically overflows the road during high flow events, creating erosion and sediment that enters the stream channel below the crossing. The portion of road that is overflowed would be armored with pit-run rock to act as a water dip, and the outfall area below the road would be armored with rip-rap to prevent additional erosion.

Thinning in Riparian Reserves on Box Creek, Section T. 34S. R. 2E. Section 28
An area of approximately 40 acres located between Box Creek and BLM Road # 34-2-29 is in need of thinning to reduce the potential for a high-intensity fire to burn through the Riparian Reserve.

Thinning would be done using hand-held equipment such as a chainsaw or machete. A 50 ft. no-cut buffer would be maintained within the Riparian Reserve on the north side of the stream. A modified cut buffer would be implemented between the road and the 50 ft. no-cut buffer. All riparian hardwood species (Oregon ash, alder, willow, big-leaf maple, cottonwood) would be left uncut. Conifer species up to 6" dbh would be thinned, with preference given to releasing large pines and cedars. There would be no treatment occurring on the south side of the stream channel. Resultant slash would be moved uphill as close to the road as possible to be piled and burned.

Thinning in Riparian Reserves on Crowfoot Creek, Section T. 34S. R. 1E. Section 15
The area is in need of fire hazard reduction treatments in order to reduce the risk of catastrophic fire, which could destroy riparian vegetation that currently provides a source of shade and large wood recruitment.

Thinning is proposed on approximately 30 acres, along one mile of stream. A modified Riparian Reserve buffer would be maintained with a no-cut buffer of 30 ft. from either side of the stream channel. Between 30 ft. and 150 ft. from the stream the proposed fuels treatments would include understory thinning by means of hand-held equipment such as a chainsaw or machete. Small trees under 4" dbh would be cut, with emphasis on thinning out Douglas fir and leaving pine, cedar, and oak species. No heavy mechanical equipment would be allowed to operate within the entire 300 ft. Riparian Reserve. Resultant slash would be moved as far from the stream as practical, piled, and burned. The Riparian Reserve would not be treated with underburning within the first 150 ft., but low intensity underburning would be allowed within the area that is from 150 ft. to 300 ft. of the stream. No handlines would be dug and no chemical fire retardants would be used within the entire 300 ft. Riparian Reserve on either side of the stream unless needed for control. In the event that the underburning should carry into the 150 ft. no-burn buffer, it would simply be allowed to burn itself out. However, no fires would intentionally be lit within the 150 ft. buffer area, and the prescribed burn would be designed to reduce or eliminate the burning of the Riparian Reserve.

2d) Other Projects

Poverty Flat ACEC Prescribed Burn

Use prescribed fire on approximately 10 acres of the ACEC to promote vegetative shift to favor native plant species.

Pump Chance Renovation T.35S. R. 2E. section 19

Renovation would include cleaning sediment out of the pump chance, removing encroaching vegetation and resetting the overflow pipe. Excavated material would be end-hauled to a site outside of the Riparian Reserve designated by the Authorized Officer.

3. ALTERNATIVE 3

The intent of this alternative is to achieve the goals, objectives, and desired future condition for the timber stands as specified in the Northwest Forest Plan, the Medford District Resource Management Plan and the Lower Big Butte Watershed Analysis. Emphasis of this alternative is placed on the findings and recommendations of the watershed analysis. Activities are designed to promote species diversity, improve existing stand vigor as well as promote the retention and development of late seral and mature seral stand conditions on the landscape. Treatments on Matrix lands emphasize stocking control to maintain or promote late seral structures in a manner consistent with enhancing productivity for commodity uses. Regeneration of mature seral stand conditions is avoided except for one treatment area where overstory from a past shelterwood harvest is displaying increased mortality, and brush dominates the understory. Like Alternative 2, non-forest lands and conifer stands withdrawn from management for timber production, have management emphasis placed on treatment of forested stands to accomplish restoration of oak woodlands and/or fuel hazard reduction.

3a) Vegetation Management Including Fuel Hazard Reduction Activities (See Alternative 3 and Fuels Hazard Reduction Map for project location)

The overall scope of this action alternative covers approximately 5,190 acres. This includes 1,450 acres of BLM managed lands designated Matrix and 3,740 acres of lands classified as Administratively Withdrawn from timber production. Matrix lands include Southern General

Forest Management Areas, Northern General Forest Management Areas and Connectivity/Diversity Blocks. Administratively Withdrawn lands consist of approximately 820 acres which are conifer forest types and 1,530 acres of oak woodland forest types. An additional 1,390 acres of non-forested brush fields and grasslands have been identified for fuel reduction treatments. This action consists of seven general treatment methods.

1. Density management of 750 acres. On Matrix lands (720 acres), retention of remnant mature overstory trees is emphasized under this alternative to provide structural diversity and promote late seral stand conditions. On Administratively Withdrawn lands (30 acres), treatment is as described in Alternative 2.

2. Understory reduction of 1,710 acres as described in Alternative 2. Treatment includes 510 acres of Matrix lands and 1,200 acres of Administratively Withdrawn lands.

3. Selection cutting of 130 acres as described in Alternative 2.

4. Modified even-aged regeneration harvest of one unit (30 acres), where past harvest combined with root disease and dwarf mistletoe mortality is resulting in the reduction of conifers and an increase in brush components. Harvest is as described for modified even-aged harvest in Alternative 2. This treatment method would occur on Matrix lands only.

5. Underburning of 420 acres of conifer and woodland areas, as described in alternative 2.

6. Brush reduction treatments on approximately 980 acres of non-forest chaparral vegetative communities and 760 acres of oak woodlands as described in Alternative 2.

7. Grassland burning of 410 acres as described in Alternative 2.

3b) Roads

Permanent Road Construction - 0.3 miles of road would be permanently constructed.

Operator Spur Construction - Four operator spurs are needed for access. After harvesting, the spurs would be fully decommissioned.

Road Renovation - Same as Alternative 2. These actions would occur on approximately 36 miles of road.

Road Improvement - Same as Alternative 2. These actions would occur on approximately 8 miles of road.

Road and Landing Decommissioning - Same as Alternative 2. These actions would occur on approximately 2.0 miles of road.

Road and Landing Full Decommissioning - Same as Alternative 2. These actions would occur on approximately 3.4 miles of road.

Constructed Helicopter Landing Decommissioning - Same as Alternative 2.

3c) Water Quality and Fisheries

Same as Alternative 2.

3d) Other Projects

Same as Alternative 2.

4. ALTERNATIVE 4 - Considered but eliminated

5. ALTERNATIVE 5

The intent of this alternative is to achieve the goals, objectives, and desired future condition for the timber stands as specified in the Northwest Forest Plan, the Medford District Resource Management Plan and the Lower Big Butte Watershed Analysis. Emphasis of this alternative is placed on management direction as it relates to wildfire risk. Activities are designed to provide for treatment of forested stands to accomplish restoration of oak woodlands and fuel hazard reduction. On Matrix lands, treatments to enhance forest vigor or productivity for commodity output from the timber resource are deferred under this alternative. Improved stand vigor and productivity across all land allocations, would only occur as a result of meeting a desired condition for reduction in fire risk.

5a) Vegetation Management Including Fuels Hazard Reduction (See Map Alternative 5 Map and Fuels Reduction Map for project location).

The overall scope of this action alternative covers approximately 4,800 acres. This includes 1,060 acres of BLM managed lands designated Matrix and 3,740 acres of lands classified as Administratively Withdrawn from timber production . Matrix lands include Southern General Forest Management Areas, Northern General Forest Management Areas and Connectivity/Diversity Blocks. Administratively Withdrawn lands consist of approximately 820 acres which are conifer forest types and 1,530 acres of oak woodland forest types. An additional 1,390 acres of non-forested brush fields and grasslands have been identified for fuel reduction treatments. This action consists of five general treatment methods:

1. Density management of 430 acres. Under this alternative densities would be reduced only to the level needed provide a stand condition which would not sustain a running crown fire. This would be accomplished by removing smaller understory and midstory components to reduce ladder fuels and maintain a canopy closure of approximately 60%. Treatment includes approximately 400 acres of Matrix lands and 30 acres of Administratively Withdrawn lands.

2. Understory reduction of 1,800 acres as described in Alternative 2. Treatment includes 600 acres of Matrix lands and 1,200 acres of Administratively Withdrawn lands.

3. Underburning of 420 acres of conifer and woodland areas to reduce stand replacing fire potential. Approximately 60 acres of Matrix lands and 360 acres of Administratively Withdrawn lands would be treated.

4. Brush reduction treatments on approximately 980 acres of non-forest chaparral vegetative

communities and 760 acres of oak woodlands as described in Alternative 2.

5. Grassland burning of 410 acres as described in Alternative 2.

5b) Roads

Permanent Road Construction - 0.2 mile of permanent road would be constructed.

Operator Spur Construction - Four operator spurs are needed for access. After harvesting, the spurs would be fully decommissioned.

Road Renovation - Same as Alternative 2. These actions would occur on approximately36 miles of road.

Road Improvement - Same as Alternative 2. These actions would occur on approximately 8 miles of road.

Road and Landing Decommissioning - Same as Alternative 2. These actions would occur on approximately 2.0 miles of road.

Road and Landing Full Decommissioning - Same as Alternative 2. These actions would occur on approximately 3.4 miles of road.

Constructed Helicopter Landing Decommissioning - Same as Alternative 2.

5c) Water Quality and Fisheries

Same as Alternative 2

5d) Other Projects

Same as Alternative 2

D. MANAGEMENT ACTIONS COMMON TO ALL ACTION ALTERNATIVES (Project Design Features--PDF)

1. Minimize the total number of skid roads by designating skid roads with an average of 150' spacing. Avoid creating new skid roads and utilize existing roads where feasible in order to minimize ground disturbance, especially in thinning and selective cut units where no tillage is proposed. Rip skid roads as identified.

2. All tractor yarding, soil ripping, and excavator piling operations would be restricted from October 15 to May 15 or when soil moisture exceeds 25 percent. Rip identified access spur roads to a depth of 18" utilizing a subsoiler or winged-toothed ripper.

3. Lop and scatter, pile or underburn activity slash as necessary to reduce or eliminate additional fuel loading. Burn piled slash during the fall and winter to reduce impacts on air quality. All burning would follow the guidelines of the Oregon

Smoke Management Plan.

4. Restrict tractor and/or mechanical operations to slopes generally less than 35 percent. In areas where it is necessary to exceed 35 percent, utilize ridge tops where possible.

5. Waterbar all skid roads and firelines during the same operating season, as constructed.

6. All road renovation, closure, and/or improvement work would be restricted from October 15 to May 15 or when soil moisture exceeds 25 percent.

7. Block or barricade identified roads after use and before beginning of rainy season (generally October 15).

8. No timber harvesting would occur within Riparian Reserves.

9. All roads and landings identified for decommissioning would be revegetated with native plant material (if available) and mulched in the same operational season they are decommissioned.

10. Skid roads would be located to minimize disturbance to coarse woody debris. Where skid roads encounter large, coarse woody debris (CWD) a section of the CWD is to be bucked out for equipment access. The remainder of the CWD is to be left in place and not disturbed.

11. Protection buffer reserves of 100' minimum would be established around Bureau Special Status plants species and Survey and Manage plant and fungi species, category A, B, C, D, and E to ensure viability of populations and habitat conditions.

12. Fall burning, slashbuster, and hand treatments could occur after July 15th through sites where Special Status Vascular plants were discovered. Handpiles would be created outside population areas.

14. Survey and Manage lichen species category A, B, and E and Special Status BSO lichen species found in fuel treatment units would be protected by establishing 100 foot protection buffers or designing prescribed underburns with minimum flame lengths and heat loads that ensure survival of host trees, crowns and minimize bole scorching.

15. For heavy equipment operations, intermittent and ephemeral stream crossings would be pre-designated by an authorized officer to prevent stream bank degradation. Slash buster operations would be parallel to intermittent and ephemeral draws.

16. Selected areas of the chaparral vegetative community would be seeded with native grasses, as available.

17. Refueling of equipment would occur outside of the Riparian Reserves.

18. A Spill Prevention, Control and Countermeasure Plan (SPCC) would be required prior to operation and would include, but not limited to, hazardous substances to be used in the project area and identification of purchasers representatives responsible for supervising initial containment action for releases and subsequent cleanup.

19. All hazardous materials and petroleum products would be stored outside of the Riparian Reserves, in durable containers and located so that any accidental spill would be contained and not drain into the stream system.

20. No firelines would be built, or the use of fire retardant chemicals allowed within Riparian Reserves for fuels treatment projects, unless needed for control.

21. No application of dust abatement materials such as lignin, Mag-Chloride, and/or approved petroleum based dust abatement products 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' of a water body or stream channel.)

22. No known bald eagle nest trees, perch tree, or roost trees would be cut. Suitable eagle habitat within ¼ mile of the nest would not be removed. Large snags within ½ mile of the nest would not be cut, except as needed to protect human safety.

23. Seasonal restriction January 1 to August 31 for work activities within ¼ mile (½ mile line-of-sight) from occupied eagle nest.

24. Seasonal restriction of March 1 to September 30 within ¼ mile of known spotted owl sites (within ½ mile for helicopter operations). May be waived if non-nesting is determined.

25. Meadows and natural openings would be buffered with a 300 foot no commercial harvest buffer (pre-commercial thinning, handpiling and burning would be allowed).

26. Protect known great gray owl nests with 1/4 mile (125 acres) buffer. Any new nest located after sale would be protected consistent with the applicable contract stipulations.

27. Seasonal restriction and road closure in RMP designated Big Game Winter Management Area from November 15 to April 1.

28. Protect kestrel nest with 5 acre no harvest buffer and seasonal restriction for

activities within ¼ mile of nest tree from March 1 to June 15.

29. Protect sharp shinned hawk nest with 10 acre no harvest buffer and seasonal restriction for activities within ¼ mile of nest tree from March 1 to June 15.

30. Seasonal restriction within ¼ mile of Northern goshawk nest from March 1 through August 30.

31. Snags that must be felled for safety would be left on site.

32. Buffer areas where there are known or newly discovered archeological sites as needed to avoid disturbance.

33. Conduct archeological pre-project field surveys in areas where firelines would be placed.

34. No tractor firelines would be constructed within 100 feet of an existing road.

35. No new permanent or temporary roads would be constructed within Riparian Reserve lands.

36. Construction of firelines within the ACEC would be with hand tools only.

37. Prior to moving into the project area, heavy equipment shall be washed to remove noxious weed seeds.

38. All bare soil areas created by slashing treatments within the Riparian Reserve would be seeded and planted with native species or other appropriate species to reduce erosion.

39. Native grass seed would be sown on fuel treatment areas as appropriate and as available.

40. All disturbed areas would be assessed and revegetated with native grasses, or non-native grasses as appropriate.

41. Utilize seed, straw and mulch that are certified noxious weed free.

42. To minimize cumulative effects of soil disturbance and associated erosion from slash buster fuel treatments, implement approximately one third of the total acreage per year for three years.

43. For all slashbuster treatment areas, minimize ground disturbance by utilizing slashed vegetative materials as a buffer from the mineral soil.

44. Divert the stream around the work area in a manner (e.g. pipe, or lined ditch) that

would minimize stream sedimentation. Contractor would submit a water diversion plan for approval prior to instream work. To reduce movement of sediment downstream from the project site, the use of straw bales, geotextile fabric or coconut fiber logs/bales immediately downstream of the work area would be required.

45. Locate all waste material sites outside of Riparian Reserves.

46. When removing a culvert and not replacing it, pull back the slopes to the natural slope or at least 1:1 to minimize sloughing, erosion and potential for the stream to undercut streambanks during periods of high streamflows.

TABLE 4: THE ALTERNATIVES AND THE ISSUES - SUMMARY OF THE CONSEQUENCES

Issues	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 5
1)Vegetation				
a) Dense forest stands and declining tree vigor.				
*Acres receiving silvicultural treatment	0 acres	2410 acres	2270 acres	1880 acres
*Change in number/density of trees per acre	Relative density @ 60%+	270 acres (Rel. Density 10 - 20%) 1370 acres (Rel. Density 35 - 45%) 770 acres (Rel. Density 50%+)	30 acres (Rel. Density 10 - 20%) 1430 acres (Rel. Density 35 - 45%) 810 acres (Rel. Density 50%+)	0 acres (Rel. Density 10 - 20%) 980 acres (Rel. Density 35 - 45%) 900 acres (Rel. Density 50%+)
*Change in growth of timber stands after treatment	Minimum growth per tree, growth/acre offset by mortality in deteriorating stands	Stand growth at or near maximum, growth potential redirected to planted trees in regeneration areas.	Stand growth increased, growth potential redirected to planted trees in regeneration areas.	Stand growth maintained, growth/acre offset by mortality in deteriorating stands.
b)Native oak woodlands/grasslands				
*Acres of woodlands treated	0 acres	1,530 acres	Same as Alternative 2	Same as Alternative 2
*Acres of brushfields treated	0 acres	1,000 acres		
*Acres of grasslands treated	0 acres	410 acres		
*Acres seeded with native seed	0 acres	1,000 acres		
2) Fuels hazard reduction				
* Acres receiving treatment	0 acres	5,340 acres	5,220 acres	4,820 acres
* Acres receiving treatment in Urban Interface	0 acres	5,340 acres	5,220 acres	4,820 acres
* Change in fuel models	See Intensity Ranking Graph	See Intensity Ranking Graph	See Intensity Ranking Graph	See Intensity Ranking Graph
* Change in flame lengths	6- 19 feet	1-4 feet	1-4 feet	1-4 feet
3) Hydrology/Water Quality				
a. Sediment Reduction				
* Miles of roads improved	0 miles	8 miles	8 miles	8 miles
*Miles of roads renovated	0 miles	36 miles	36 miles	36 miles
*Miles of roads decommission	0 miles	2 miles	2 miles	2 miles
*Miles of roads full decommission	0 miles	2.5 miles	2.5 miles	2.5 miles
4)Aquatic Habitat/Fisheries				
a) Riparian Health				
*Acres thinned in Riparian Reserve	0	70	70	70
*Miles of road decommissioned in RR	0	1.5 miles	1.5 miles	1.5 miles
b) Fish Barriers				
* Number of barriers removed on fish bearing streams	0	2	2	2

Issues	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 5
5)Wildlife Habitat				
*Acres of deer and elk forage treated	0 acres	1390 acres	1390 acres	1390 acres
*Spotted owl nesting to dispersal habitat	0 acres	140 acres	170 acres	160 acres
*Nesting habitat to not suitable	0 acres	30 acres	0 acres	0 acres
*Roosting/foraging to dispersal	0 acres	846 acres	894 acres	740 acres

III. AFFECTED ENVIRONMENT

A. Introduction

This chapter describes the present condition of the environment within the proposed project area that would be affected by the alternatives. The information in this chapter would serve as a general baseline for determining the effects of the alternatives. No attempt has been made to describe every detail of every resource within the proposed project area. The information is organized around the major issues identified by the interdisciplinary team. 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. All required survey and managed surveys have been completed. No spotted owl critical habitat would be entered with timber harvest or prescribed fire. (See appendices A, B and C)

The following critical elements are not known to be present within the proposed project areas, or would not be affected by any of the alternatives, and would not be discussed further: Cultural Resources, Prime or Unique Farmlands, Flood plains, Native American Religious Concerns, Water Quality, Wetlands, Wild and Scenic Rivers, and Wilderness. The Poverty Flat ACEC values that led to the designation of the ACEC would not be affected by the proposed projects.

B. General Description of the Proposed Project Area

A description of the land areas and resources in the Butte Falls Resource Area is presented in Chapter 3 of the Final Medford District Resource Management Plan/Environmental Impact Statement (RMP 1995).

For a detailed description of the watershed refer to the Lower Big Butte Watershed Analysis, completed September 1999. This document is available at the Butte Falls Resource Area, Medford District BLM Office.

1. Vegetation

Majority of the conifer stands within the Lower Big Butte watershed are classified as being in an early to mid seral condition (0 to 11 inch average tree diameter). On federal lands, plantations make up a large part of the this classification and dominate the landscape in areas such as the Clark Creek drainage. Plantations have in general been maintained in a vigorous condition with pre-commercial thinning activities. Stand inventories and field reviews however indicate that natural stands of the same size classes have not been thinned and generally have stocking levels which are at the point where density dependant mortality would occur (Appendix I).
Late and mature seral stands (11 inches or greater tree diameter), are less common and are generally in a widely scattered distribution across the landscape. The majority of the late to mature seral stands also exist as highly stocked single story stands or have a dense well developed understory conifer layer as a result of partial cutting and/or fire suppression (LBB WA pgs 12 & 44).

The overall condition of late seral and mature stands in the watershed is one in which stand densities have increased. This has increased soil moisture and nutrient demands which result in

increased tree stress and greater numbers of trees predisposed to insect and disease attack (LBB WA pp 44). Species such as pines become stressed easily during periodic droughts and are more susceptible to insect attack (AGEE, 2000). As a result, the representation of mature early seral species such as ponderosa pine, sugar pine and hardwood species has declined over time. Due to past harvest of large diameter overstory trees and the absence of the low thinning effect of fire, there has been a shift from early seral species such as pine, to mid-/late seral species such as Douglas-fir, incense cedar or white fir. The resulting structure is one in which mature larger trees (20 inches in diameter and larger) have decreased in number, vertical canopy structure has increased and a shift in species representation to more shade tolerate species has occurred (LBB WA p 44).

Oak woodlands and mixed conifer/oak woodlands have similar stocking and structure changes as the conifer stands. In oak woodlands, encroachment of conifers and non-native vegetation has resulted in reduced forage palatability and increased fire risks. Higher woodland stocking levels as a result of fire suppression has also resulted in poor existing growth rates and mortality of hardwood trees (LBB WA p 47).

The current trend for natural stands in the Lower Big Butte watershed, especially the late seral and mature seral stands, is one which would have lower resilience and reduced sustainability. The absence of fire and past partial cutting of larger trees has decreased the abundance of old growth types that are dependant on frequent fires. As a result forest types that are less fire resistant have become more widely distributed. This interruption in fire regimes and shift in species composition is resulting in changes in long-term soil productivity, stand structure and function, forest health and biological diversity. The resulting risk for catastrophic loss of habitat due to wildfire is considered high for dry provinces such as the area defined as the Lower Big Butte watershed (FSEIS, 1994). Dense stand conditions, reduced vigor and risk to disturbance are currently the primary factors affecting forest health on BLM lands in the watershed. Low elevation Douglas-fir, ponderosa pine and oak woodland sites are of particular concern with respect to current stocking levels. With the absence of thinning disturbances such as fire or mechanical treatments, these sites have stocking levels which are exceeding the carrying capacity of the site. Loss of seral pines and hardwoods has reduced these stands resilience to insects, disease and wildfire.

Shrub/wedgeleaf chaparral/grasslands

Shrub lands. Generally, fire is the primary agent for creating and maintaining early seral stage shrub and grass plant communities. In the absence of fire, much of this habitat type has matured and is becoming decadent, with tough woody or dead branches and less tender, palatable new growth.

Grasslands. The quantity and quality of grass/forb/herbaceous habitat through the watershed has declined due to the invasion of non-native grasses and forbs and the encroachment of shrubs and conifers into the grasslands. Encroachment has primarily been the result of human activities, such as roads, grazing, and fire exclusion over the past century. Competition from non-native plants, primarily star thistle and medusa head in the lower elevations have reduced native forbs and grasses.
This project occurs within the known range of *Fritillaria gentneri,* a Federally listed "Threatened"

species. Potential habitat for *Fritillaria gentneri* exists within the project area and all areas have been surveyed. Two new *Fritillaria gentneri* sites were discovered during field surveys in 2001. Both sites were protected with 50 foot no treatment buffers. The project would have **"No Effect"** on *Fritillaria gentneri*.

Poverty Flats ACEC was established as an unusual natural ecosystem that developed over a shallow soil and basalt bedrock outcrop, which includes a unique intermittent stream wetlands ecosystem. Poverty Flats ACEC was designated in 1994. The area was proposed and later designated as an unusual natural ecosystem. A subspecies of Wooly Meadow-Foam (*Limnanthes floccosa ssp. bellingeriana*), a Special Status Plant Species (Bureau Sensitive Species) occurs in the vernal pool wetlands and a wide variety of native and non-native grass and forb species endemic to grasslands occupy the ACEC.

A significant component of nonnative weeds has invaded the meadow. In the mounded areas there are star thistle, cheat grass, hedgehog dogtail, Klamath weed, Kentucky and bulbous bluegrass, mullein, and rattail fescue. In the wetland areas, moist site grasses such as, velvet-grass (*Holcus lanatus*) and witchgrass (*Panicum capillare*) can be found. It appears the rock used for the road way, parking areas, and turn-outs has added considerably to the introduction and spread of non-native weeds within the ACEC.

A large seasonally wet area occurs within the ACEC where surface water accumulates and persists into the late spring. This unique seasonal habitat provides habitat for rare species, such as Wooly Meadow-Foam (*Limnanthes floccosa ssp. bellingeriana*), *Perideridia howellii*, *Scribneria bolanderi*, and other unusual seasonably aquatic species such as Monterey mariposa, common camas, Bach's downingia, and two species of monkey flower.

Where deeper soils occur, the vegetation composition changes quickly to a hardwood/brush species collection dominated by Oregon white oak, madrone, manzanita, and into Ponderosa Pine and Douglas-fir stands. A unique assemblage of shade tolerant grasses, annuals and perennials occur under the conifer/hardwood over-story with decreases in non-native grasses and forbs. Lichen species such as *Bryoria tortuosa* is known to occur on white oaks in the ACEC and *Lobaria hallii* is known to occur in similar habitat and suspected on the site.

The early spring vegetative community is comprised mostly of native forb species and predominantly includes wild onion, yellow monkey flower, bicolored limnanthus, and rosy plectritis among others. Perennial grasses such as California oat grass, Idaho fescue, Lemmon's needle grass, and slender hair grass occur on the mounded, dryer areas and compete with non-native grasses. Later in the spring non-native species dominate many areas of the ACEC.

2. Fuel Buildup and Fire hazard

Of the 43,817 acres within the watershed approximately 80% are in a high intensity fire hazard classification(see Fire Hazard Classification Map). The BLM manages approximately 14,000 acres of which 80% are also classified as at risk for high intensity fires. A portion of this watershed is classed as rural interface with a number of rural residences adjacent to BLM managed land. This presents a unique and difficult set of challenges to fuels management and fire suppression. There are two primary ignition sources within this watershed; 1) human caused and 2) natural or lightning

caused. Because of the of the percentage of high hazard fuels, multiple fire starts can pose a significant risk in this area. Multiple starts are more likely to occur during lighting events. The primary areas of concern for fire occurrence are those lands that fall between 1,500 and 3,500 feet in elevation. Coincidentally, these areas are the most populated increasing the potential of human caused fires. South aspects and steeper slopes add to the hazard rating, as well as, existing vegetative structure conditions (See Vegetation section).

The primary vegetative structure contributing to fire risk is the development of a vertical fuel component in brush fields, woodlands and conifer stands. Fuel models 4 and 6 dominate the landscape and differ primarily on the amount and type of shrub layer present. Fuel model 4 is typical for the existing brush fields and oak/pine woodlands where buckbrush (*Ceanothus cuneatus*) is a dominant component. Fuel model 6 is a more typical classification for the brush and mixed conifer stands where species such as manzanita are more common. Closed canopy conifer stands with continuous ladder fuels typically fall between these two fuel models. The potential for running crown fire exists in conifer stands with canopy closures greater than 70% and an under story/mid-story conifer layer providing for a vertical live fuel component. These fuel models (and related vegetation structures) are of particular importance because of the vertical component that allows fires to move from the ground fuels into the canopy. This provides for multi-dimensional fire behavior. The primary carrier of these fires to the upper crowns is the live vegetation itself as opposed to most fuel models whose behavior is based on the dead fuel component. The importance of this is, these fires are outside the normal range of predictive behavior and are considered stand replacing events.

The greatest likelihood of a fire start exists within the urban interface (below 3,500 feet in elevation) which is dominated by fuel models 4 and 6. Under typical mid to late fire season conditions, the expected flame lengths for these fuel models range from 6 to 19 ft. Flame lengths in excess of 4 ft. cannot be attacked by hand crews and flame lengths in excess of 11 feet can result in crowning and spotting with major fire runs probable. As a result, the potential for control of a fire start is compromised and the likelihood of catastrophic disturbance within the urban interface is high. Given the continuity of high intensity fuel types, the potential exists for fire starts to spread beyond the urban interface and into the upland areas above 3,500 feet in elevation. Urban agricultural areas (approximately 3,600 acres) are the primary low intensity fuel type currently present within the urban interface area. Agricultural lands are concentrated along Butte Falls Highway, Crowfoot Road and Cobleigh Road. These areas provide for existing fuel breaks in that they are typically irrigated and/or are grazed and flame lengths under typical dry, mid to late fire season conditions are expected to be 2-4 ft. Flame lengths less than 4 feet can generally be attacked by hand crews.

Uplands, above 3,500 feet elevation, are currently in a moderate to high fuel hazard condition. Uplands are also typified by fuel models 4 and 6 but inclusions of light timber litter (500 acres) and timber with moderate ground fuels (1,600 acres) are also present (fuel models 8 and 10). Flame lengths in the timber groups can range from 1 to 5 feet, but torching and spotting potential exists where heavy ground fuels accumulate. Small shrub/grasslands and barren areas (2,200 acres) exist throughout the watershed but tend to be a more common component of the fuel complex within upland areas. Small shrub/grasslands are generally described as fuel models 1 or 2 and have expected flame lengths of 1 to 5 feet. The distribution of fuel models 1 and 2 is scattered

but some continuity of this type can be found along mid-slope locations to the northeast of Big Butte Creek. Where this occurs, somewhat of a natural fuel break separating uplands from lower elevation urban interface areas is provided.

3. Soils - For a more complete description of the existing environment, see the Lower Big Butte Watershed Analysis. See Appendix H for the Soils report for proposed Lower Big Butte projects.

Proposed Timber Harvest Areas

Soils in the project area have formed in alluvial and colluvial materials derived from weathered volcanic rocks that are mostly andesite, tuffs, and breccias. The parent materials of these soils greatly influence their physical properties and their response to disturbance from management activities. (For descriptions of individual soil characteristics see appendix H)

When considering the effects of land management practice on soil erosion, the most influential factors are: the type of management practice, the geology, the geomorphology, soil type, and the timing of major storms. Identifiable factors like soil type, topography, and geologic materials along with the type of forest practice help to predict the potential risks of soil erosion. However, the timing and intensity of subsequent rain storms is the most important factor in how much erosion might occur. It is also the most unpredictable of these factors. Because of this unpredictability and the high variability of the other factors, quantification of soil erosion from individual timber harvest or fuel treatment units is not feasible. For this reason, these types of effects are expressed in terms of expected risk levels and are not quantified. In analyzing for these effects, conclusions are based on the assumption that the project design features, restoration projects, and proposed mitigating measures would be appropriately implemented.

Proposed Fuels Treatment Areas

Prescribed Fire

Soil characteristics having the most influence on potential adverse impacts (long-term loss of soil productivity) from fire are the thickness of duff (organic) layer and the soil depth. Therefore, soils that are shallow (<20" deep) and/or that have thin duff layers (<1" deep) are most susceptible to adverse impacts from fire. The McMullin soil is typically shallow and has a thin duff layer. The Medco soil is moderately deep but usually has a duff layer approximately 1"-½" in depth. Carney clays usually have thin duff layers. The other soils within the project area have characteristics (deeper profiles, thicker duff layers) that make them less susceptible to fire effects.

Mechanical (Slash Buster)

Soil characteristics that influence the amount of adverse impact from mechanical equipment are soil texture, soil moisture content, and steepness of slope. Typically, the greater amount of clay in the soil the more susceptible it is to compaction. Also, soils with greater amounts of clay typically hold more water for longer periods. Soils with slopes greater than 35% are most susceptible to runoff and erosion in areas disturbed by mechanical equipment. Medco and Carney soils have high clay content (>35%) and are most susceptible to compaction. All soil types are susceptible to runoff and erosion from disturbance on slopes greater than 35%.

4. Wildlife

For a more complete description of the existing environment, see the Lower Big Butte Watershed Analysis. See Appendix C for wildlife report for proposed Lower Big Butte projects.

Special land designations for wildlife in the Lower Big Butte Creek Watershed: Five Northern spotted owl (NSO) activity centers are within the watershed boundaries. Other wildlife designations are late-successional connectivity block (T. 34S, R. 2E, Section 21), "Big Game Winter Range and Elk Management area" in the northwest part of the watershed west of Crowfoot Road (T. 34 S., R. 1E., Sections 9, 10, and 17) and NSO "critical habitat" in the Clark Creek drainage.

T&E SPECIES

Northern Spotted Owl

All proposed actions may adversely affect NSO. Formal consultation with USFW has been completed. The project would be covered under ROGUE RIVER/SOUTH COAST FY 01/02/03 MEDFORD DISTRICT, Bureau of Land Management, ROGUE RIVER and SISKIYOU National Forests BIOLOGICAL ASSESSMENT 18 July 200l and Biological Opinion (FWS) 1-7-01-032, 12 October 2001.

Three sections within the Clark Creek drainage fall within NSO owl critical habitat unit (CHU) OR-36. This area is currently deferred from timber harvest (Medford BLM District Resource Management Plan Record of Decision [RMP], P.43). No timber harvest is proposed in designated NSO Critical Habitat.

One hundred acre activity centers are established around five NSO sites. The sites will be managed as Late-successional reserves (LSR). The activity centers are 100 acres of the best habitat as close to the activity center as possible for all NSO centers known as of January 1, 1994 (*Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl Standards and Guidelines* [ROD], pg C-10).

Three additional NSO sites have been found in the watershed. Activity centers were not established for these sites because they were discovered after January 1, 1994. Surveys were conducted in 2001. No NSOs were found at two of the sites. The third site has a pair of NSO which have not been found to be nesting in the two years since the site was discovered.

T. 34S, R. 2E, section 21 is a RMP/ROD connectivity block. Ninety-three acres of the best Late-successional habitat in the section outside the NSO activity center have been deferred from harvest at this time. When added to the 100 acre NSO LSR activity center, 193 acres would be deferred from harvest. This will maintain 30% of the connectivity block in Late-successional condition.

Bald Eagle

A bald eagle nest was found near Big Butte Creek in 1999. The eagles have not nested in the nest since it was discovered. The nest would be checked annually to learn if it is occupied. A buffer has been established around the nest and a seasonal restriction on actions within ¼ mile (½ mile

line of sight) would be in place from January 1-August 15 for any year nesting occurs. Because the proposed action would occur within ¼ mile of a bald eagle nest, the action "may affect" the bald eagle. Formal consultation with USFW has been completed. The project is covered under ROGUE RIVER/SOUTH COAST FY 01/02/03 MEDFORD DISTRICT, Bureau of Land Management, ROGUE RIVER and SISKIYOU National Forests BIOLOGICAL ASSESSMENT 18 July 200l and Biological Opinion (FWS) 1-7-01-032, 12 October 2001. Management recommendations in the USFW BO would be followed.

SURVEY AND MANAGE

Great Gray Owl
Surveys for great gray owl have been completed to Current Interagency Protocol (April 1995). Four nests were found. A ¼ mile protection buffer has been established around these nests. No management is currently planned in these protection buffers. A seasonal restriction from March 1 - August 1 would be in effect ¼ mile from any active nest site.

Mollusk
Mollusk surveys were completed using current protocol in effect at the time, *Survey Protocol for Terrestrial Mollusk Species From the Northwest Forest Plan, Version 2.0*. One unknown mollusk specimen was located which had some characteristics similar to *Monadenia chaceana*. This specimen has been sent off for identification, and no positive identification has been received. The site will be treated as though it is a survey and manage specimen and the unit boundary will be moved to avoid the site. No other survey and manage mollusks were found.

Red Tree Vole
Red tree vole surveys were completed on all proposed timber sale units using protocol in effect at the time, Interim Version 1.0. No red tree voles or any suspected red tree vole nests were found. No resin duct clumps or other evidence of red tree vole were observed.

Survey and Manage Protocol for Red Tree Vole, Version 2 was received in February 2000. The Lower Big Butte project area is outside the known or suspected geographic range of the red tree vole (*Survey Protocol for the Red Tree Vole, Version 2.0, pg. 5*). Surveys are no longer required in the watershed.

SENSITIVE SPECIES
A review of special status species that could occur in the Butte Falls Resource area was completed (see attached table).

The proposed actions, while potentially adversely affecting local individuals of sensitive wildlife species and causing loss of habitat, and disrupting the animals in the year the action occurred, is not expected to affect long term population viability of any species known to be in the area.

Goshawk
Two years of goshawk surveys were done in timber stands that appeared most likely to provide good goshawk habitat. Two nests were found within the watershed. One nest was protected with a 30-acre buffer adjacent to a NSO activity center. The connectivity block south of the goshawk nest stand has 193 acres of the best Late-successional habitat reserved from timber harvest activity.

Two hundred and thirty-three acres would remain protected from timber harvest near the nest site. The second goshawk nest is in a NSO activity center that has 100 acres protected from harvest.

None of the proposed actions is expected to have significant impacts to the species, nor lead to the need to list the goshawk as T&E. A seasonal restriction would be effective March 1 through August 30 for actions within ¼ mile of known nest sites.

A petition to list the Northern goshawk in the western United States as a threatened species was considered by USFW in 1998. The final conclusion was published in *USFW Federal Register notice dated June 29, 1998 Volume 63, Number 124, pg 35183-35184.* See wildlife report, Appendix C fro a discussion of the USFW findings.

Other Raptors

A kestrel and a sharp shinned hawk nest were found during field surveys. These nests are being buffered with a no-entry buffer of 5 acres for the kestrel nest and 10 acres for the sharp shinned hawk nest. A seasonal restriction from March 1 through August 15 would be in place for activities within ¼ mile of the nests if they are active.

Bats

No known caves, mines, abandoned wooden bridges and buildings are within any proposed timber sale unit. Snags and large hollow oaks would be left in the proposed units to provide roosting habitat. Townsend's big-eared bats are present in a cave at Poverty Flat ACEC. No timber harvest is proposed within the ACEC.

OTHER WILDLIFE SPECIES

Cavity Nesters

Snags and coarse wood. All of the proposed action alternatives would meet minimum ROD standards for snag retention where it currently exists. Extra trees would be left to meet future snag requirements where currently deficient numbers exist in the units proposed for regeneration harvest.

Game Animals

Big Game Winter Range and Elk Management Area. Approximately 820 acres to the west of Crowfoot Road within the watershed boundary is designated in the Medford District RMP as "Big Game Winter Range and Elk Management Area". This is a small part of the large winter range and management area between Crowfoot Road and the Rogue River which overlaps with the Lower Big Butte watershed. Guidelines in designated winter range are to maintain at least 20% of the area in thermal cover and observe a seasonal restriction to avoid disturbance from November 15 to April 1. (See wildlife report).

Seasonal restriction recommendations in winter range are to close all roads except major collectors and arterial during the seasonal restriction and minimize new road construction. The two access roads into this area with BLM control are currently gated. These roads are included in the Oregon Dept. of Fish and Wildlife Jackson Cooperative Travel Management area and are closed to vehicle traffic from November 15-April 30. Adequate thermal cover is present in the winter range.

Migratory Land Birds

Migratory birds are present during spring, summer, and early fall. A road survey was conducted along Cobleigh and Dog Creek roads in the spring of 1995 and 1996 to develop a list of bird species in the watershed at that point in time. There is no planned direct or indirect take of migratory birds.

SPECIAL OR UNIQUE HABITATS

Oak woodlands/savannah

Oak woodlands/oak savannahs are generally declining. Oregon white oak is a fire dependent species. According to a report by James Agee and Mark Huff (The Role of Prescribed Fire in Restoring Ecosystem Health and Diversity in Southwest Oregon, September 2000), research has found area and perimeter of forest openings in the Klamath Mountains has decreased from 26% to 16%. The lack of fire has resulted in oak thickets with reduced growth and conifers encroaching into the woodlands and meadows. This has slowed development of large open grown "savannah" oak trees that provide natural cavities and acorns and are important to a variety of wildlife species.

Shrub/wedgeleaf chaparral/grasslands

Shrub lands. Generally, fire is the primary agent for creating and maintaining early seral stage shrub and grass plant communities. Lacking fire, much of this habitat type has matured and is becoming decadent, with tough woody or dead branches and less tender, palatable new shoots. As a result, the habitat quality of the grass and shrubs important for wildlife is decreasing (*Lower Big Butte watershed analysis*, pg 19). Dense stands of manzanita create barriers to big game movement and reduce the amount of available forage. Hunting opportunities for great gray owl, great horned owl, and other raptors, such as red tail hawks are also hindered by dense shrub communities.

Grasslands. The quantity and quality of grass/forb/herbaceous habitat through the watershed have declined due to the invasion of nonnative grasses and forbs and the encroachment of shrubs and conifers into the grasslands. Encroachment has primarily been the result of human activities, such as roads, grazing, and fire exclusion over the past century. Competition from nonnative plants, primarily star thistle and medusa head in the lower elevations have reduced native forbs and grasses. Many nonnative species are not palatable to wildlife. This has reduced the amount and quality of forage. In a more natural system, fire kills many developing shrubs, oaks, small conifers and maintains an open stand of grass savannah.

5. Hydrology/Water Quality

The hydrology and climate of the Lower Big Butte project area is typical of the Southern Oregon Cascades. This area has a Mediterranean climate which consists of typically cool, wet winters and hot, dry summers. Precipitation ranges from 35 to 50 inches annually and varies with elevation and aspect. Typically, most precipitation occurs in the late fall, winter, and early spring as rainfall, with the exception of higher ridges where snow accumulates.

Big Butte Creek is a principal tributary to the Rogue River. Generally, Big Butte Creek flows northwest and empties into the Rogue River just below Lost Creek Dam. The drainage area of this project area includes mostly lower elevation foothills and the lower slopes of the Cascade Range.

The Lower Big Butte project area lies within the Big Butte Creek 5th Field Watershed. This watershed includes all the lands that provide runoff draining into Big Butte Creek and its tributaries. The Big Butte Creek Watershed is divided into smaller 6th field subwatersheds, which are further divided into 7th field drainage areas.

The Lower Big Butte project area is made up of four subwatersheds. These are Clark Creek, Big Butte Creek - Middle, McNeil Creek, and Big Butte - Lower. Clark Creek has been deferred from management activities, including timber harvest, due to a high level of cumulative effects from openings in the transient snow zone (TSZ) and soil compaction within the subwatershed. Within these four subwatersheds, there are a total of twenty seven drainage areas. Of these twenty seven drainage areas, seventeen lie within the proposed project area.

There are approximately 68 acres of proposed timber harvest, which occur outside of these four subwatersheds. These acres lie mainly on ridge tops and are included for treatment because of similar stand conditions. There are approximately 38 acres in the Big Butte Creek - North Fork subwatershed and approximately 30 acres proposed in the Little Butte - Lick subwatershed. These subwatersheds lie in the Big Butte Creek Watershed and the Little Butte Creek Watershed respectively.

Seven major tributaries feed the lower reaches of Big Butte Creek. McNeil Creek and Crowfoot Creek drain the western and southern foothills and flow in a north and easterly direction, while Vine Creek, Clark Creek, Gray Creek, Dog Creek, and Box Creek originate from Round Mountain and Fredenburg Butte region. Stream reaches are generally constrained by high terraces, hillslopes, and some V-shaped valley types. Where floodplains exist, they are generally narrow and restricted by confining terraces. These valley types are associated with Rosgen stream classification type A and B streams. On the lower valley floor, the stream channels become more sinuous and less steep. These reaches are associated with Rosgen type C streams.

The United States Geological Survey (USGS) has operated a gaging station within the Lower Big Butte project area since October of 1945. The gaging station is located near the mouth of Big Butte Creek near Mcleod, OR (14337500). The drainage area of Big Butte Creek 5th field watershed is 245 square miles. The drainage area of the Lower Big Butte project area is 68.5 square miles. The peak flow for this site came during the flood of Dec. 22, 1964 where the discharge from floodmark was 16,800 cubic feet per second (cfs). The low flow for this site was measured on June 23, 24, 1977 at 6.4 cfs. The base discharge for this stream at this location is 1,800 cfs.

For the water years 1946 - 1999 the annual mean discharge was 263 cfs, and the annual runoff for this period is 190,300 acre-feet per year. The discharge that is exceeded for 10 percent of the time for this period is 594 cfs. For 50 percent of the time the discharge is 142 cfs., and for 90 percent of the time the discharge is 58 cfs.

There are several diversions in the vicinity of Butte Falls, the two largest being the city of Medford diversion and the Eagle Point Irrigation District Canal. (USGS Water-Data Report PR-99-1). The Eagle Point Irrigation canal is diverted periodically during repairs at a point located in 34-1E- 25, creating severe downcutting and channelization. The channel that has developed is not a natural channel, it did not occur there originally and was created only as a result of human management.

This drainage requires no protection status as a riparian reserve. However, no trees would be harvested along the bank of the channel where roots help stabilize the bank from further widening.

Water Quality

Within the Lower Big Butte project area Big Butte Creek and some of its tributaries have been identified by the Oregon Department of Environmental Quality (ODEQ) as water quality limited under Section 303(d) of the Clean Water Act. Big Butte Creek is water quality limited for temperature from its mouth to river mile three. Big Butte Creek is considered a water body of potential concern by ODEQ for sedimentation and flow modification. Dog Creek is listed for temperature from its mouth to its headwaters. Clark Creek is listed for temperature from its mouth to the north/south fork confluence.

6. Aquatic Habitat/Fisheries

The proposed projects are located in the Big Butte Creek watershed within the Rogue River basin. Major fish bearing streams within the proposed project area are McNeil Creek, Neil Creek, Quartz Creek, Crowfoot Creek, Box Creek, Dog Creek, Grey Creek, Clark Creek, and Vine Creek.

A variety of resident and anadromous fish species are found in Big Butte Creek. Anadromous fish species that utilize this stream and its tributaries are coho salmon (*Oncorhynchus kisutch*), steelhead trout (*O. mykiss*), chinook salmon (*O. tshawytscha*), and possibly Pacific lamprey (*Lampetra tridentata*). Native resident fish species include cutthroat trout (*O. clarki*), rainbow trout (*O. mykiss*), Klamath smallscale suckers (*Catastomus rimiculus*), and sculpin (*Cottus* sp.). Introduced non-native fish species include bass and bluegill.

Comprehensive aquatic habitat inventories have been completed on Dog Creek, Box Creek, and Crowfoot Creek. Overall, aquatic habitat elements are in fair condition and are currently below the desired range of conditions, indicating habitat degradation. Major habitat features found to be in an impaired condition are spawning gravel quantity and quality, pool complexity and frequency, large wood abundance, and stream shade. The major identified causes for degradation of aquatic habitat were rural development, logging, roads, and grazing.

T & E Fish Species

One special status fish species utilizes the Big Butte Creek watershed for spawning and rearing: Southern Oregon/Northern California (SONC) coho salmon. The National Marine Fisheries Service (NMFS) listed coho salmon in the Rogue River basin on May 6th, 1997 as "threatened" under the Endangered Species Act. Critical Habitat for SONC coho salmon was designated by NMFS on May 5, 1999. All fish-bearing streams within the Lower Big Butte project area are included within coho critical habitat, except for the portion of Clark Creek that is above the falls and therefore inaccessible to anadromous fish. Essential Fish Habitat (EFH) under the Magnuson-Stevens Act has also been designated for salmon, and includes all streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California. In the Lower Big Butte project area, the range of EFH is identical to that of coho critical habitat. Any reference to coho Critical Habitat in this EA therefore also includes EFH.

Thinning in Riparian Reserves on Box Creek, Section T. 34S. R. 2E. Section 28

The stand immediately adjacent to the road is primarily composed of small-diameter conifers (1"-6"dbh) which are densely crowded and would create an excellent source of ladder fuels if not

treated. Moving closer to the stream, the vegetation composition changes to a more hardwood-dominated forest with interspersed large conifers up to 30" dbh. The understory adjacent to the stream is composed of hazlenut, oceanspray, nine-bark, dogwood, and various forb species which range approximately 50 ft. upland from the stream channel.

Thinning in Riparian Reserves on Crowfoot Creek, Section T. 34S. 1E. Section 15
Crowfoot Creek is an intermittent stream which supports fish during certain times of the year, especially late fall through early spring when flows are highest. Presence/absence surveys have documented rainbow/steelhead trout as far as 3 miles upstream from the mouth of Crowfoot Creek in Section 21. The stream is thought to provide summer steelhead spawning habitat in years of high rainfall.

Within the Riparian Reserve, pockets of dense understory vegetation are interspersed with oak grasslands and brush fields dominated by wedgeleaf ceanothus. Riparian species are primarily include Oregon ash and willow, with an occasional alder or cottonwood. Most of the Riparian Reserve has very shallow, rocky soils and does not support large conifers, however there are some pockets of deep soil where larger conifers and oaks have taken hold. In these pockets, there is heavy regeneration of small pines and Douglas fir which are <4" dbh. These can easily become ladder fuels which would carry fire up into the surrounding canopy.

Road/Culvert Projects in Clark Creek
Clark Creek is a perennial stream which provides habitat for resident rainbow and cutthroat trout. Two large (approx. 50 and 100 ft.) waterfalls prevent anadromous fish from migrating upstream and using this habitat.

IV. ENVIRONMENTAL CONSEQUENCES

A. Introduction

This chapter is organized by issue to describe the anticipated environmental impacts of the alternatives on the affected environment. It provides the basis for comparing the alternatives presented in Chapter II. The detail and depth of impact analysis is generally limited to that which is necessary to determine if significant environmental impacts are anticipated.

B. Effects From Implementing Alternative 1 (NO ACTION)

1.1. Vegetation

a) Direct and Indirect Effects

Stand densities would remain near maximum levels resulting in the continued demand and competition for moisture, sunlight and nutrients. Current tree densities are resulting in increased competition and declining tree growth. The number of trees per acre is above the biologically sustainable level, resulting in a greater susceptibility to insects, disease, and severe fire behavior.

In the absence of disturbance events such as fire, density management, or regeneration harvests, the shift in species composition and structure would continue. Scattered large diameter early seral species such as ponderosa pine, sugar pine and hardwoods would continue to decline with increasing tree competition. Timbered stands would consist of densely stocked slow growing

Douglas-fir and incense cedar on drier sites, or shift to pure white fir on more moderate sites. Due to the high levels of stocking, establishment of a mixed conifer condition from more light tolerant species would be excluded. With this shift in species and structure, tree species diversity would decline and an important natural defense against insect and disease, prolonged drought, potential climatic change and fire would be lost.

Mature and deteriorating stands would not be entered and would remain at high risk to insect attacks, continued mistletoe infection, and tree mortality. These stands would continue to shift towards stands dominated by drought and fire intolerant white fir.

Oak/pine woodlands would have encroachment of conifers and brush continue increasing the structural complexity of these sites. As biomass increases on these sites potential for severe fire activity would also increase. The development and retention of larger individual hardwoods and conifers would be expected to decline due to competition for resources.

Current trends in the shrub/wedgeleaf chaparral and grasslands would continue. Noxious weed species would continue to encroach into these lands and dominate the vegetation in places. Grasslands capable of supporting shrubs would slowly convert to shrub fields.

Controlled fire would not occur on the ACEC. The current trend in increasing weed invasion, expansion and dominance would continue. Native grasses and forbs which are adapted to and respond positively to periodic fire would continue to decline in vigor and abundance. The resource values identified for creation of the ACEC would diminish. Bureau sensitive species may loose habitat to more vigorous non-native invaders.

b) Short-term Uses vs. Long-term Productivity

In the short-term (5-10 years) the no action alternative would result in the continuation of the existing forest conditions. Eventually, due to dense and deteriorating stand conditions, the probability of insect infestations and disease infections would be greater which would likely result in a decrease in long-term production.

Short-term retention of late seral structure and canopy cover is highest with the no action alternative. In the absence of thinning disturbances, overstocked mid-seral stands are expected to display a lower level shift to production of late seral conditions over the long term.

Oak pine/wood lands, shrub lands and grasslands would maintain a high level of structural variability and cover with encroaching vegetation continuing to develop. In the long term forage palatability will continue to decline, fire hazard would increase and shifts in species representation would result (ie. reduction of native grasses, grasslands shifting to brushfields and increase in conifers within woodland areas).

c) Irreversible or Irretrievable Commitments of Resources

None identified.

d) Cumulative Effects of Dense Forest Stands and Declining Stand and Tree Vigor

An increase in insects, diseases, and higher fire risk due to high stand densities would be expected.

With high stand densities and high canopy closure, more shade tolerant species would prevail. These species are usually more susceptible to insects and diseases and less able to withstand fire or drought events. In mid seral to late seral stands, a gradual reduction in existing remnant large diameter conifers and hardwoods would also be expected, as age and density dependant mortality result in the loss of individual overstory trees. Future development of large diameter trees is expected to be reduced, due to high stocking and slowed growth of smaller mid-seral trees.

Ultimately, as stands mature, the No Action Alternative would result in a species shift from mixed conifer stands to stands dominated by white fir or Douglas-fir. As mature stands begin to deteriorate and overstory components begin to die, structural complexity would increase across the landscape. Snag levels and woody debris would increase but species diversity of conifers would decline.

Without a sudden disturbance event such as wildfire, Oak pine/woodlands, shrub lands and grasslands would continue on their current trend. Within the Lower Big Butte Watershed, non-native species would be allowed to continue on their course of development and the habitat components and structure provided by lack of disturbance would become the norm across the landscape.

1.2. Fuels Hazard Reduction

a) Direct & Indirect Effects

Under this alternative vegetative conditions would remain unchanged. The resulting trend for vegetation such as dense stand conditions, shifts in species dominance and loss of mature seral pine and hardwoods would continue (see Vegetation section). This would provide for continued development of aerial fuels, maintenance of closed canopy conditions and increases in surface fuels. As a result fuel hazard conditions would continue to increase until a disturbance occurs.

b) Short Term Uses vs Long-Term Productivity

In the short term fuel loads and associated fire hazard increases are expected. As a result the potential for large destructive fire would increase until some action occurs to change existing stand dynamics. When a stand replacing fire event does occur it may have a high potential for impacts to long term site productivity. Specific resource values in which long term site productivity may be reduced are as follows:

1. Riparian and water quality - Large stand replacement fires in a watershed can adversely affect riparian areas either by burning the riparian zone itself or by up slope erosion and land slides. (Agee, 2000). In addition development of a water repellent layer from severe surface fire reduces infiltration capacity of the soil and increases the potential for overland flow (McNabb & Swanson, 1990).

2. Soils - Severe stand replacing fire may reduce available soil nutrients as well as slope stability in landslide prone areas. A continued shift in species composition from retention of early seral tree species to a higher constancy of late seral species would produce higher crown bulk densities and a shallower rooting habit. The result is increased crown fire potential and increased potential for volatilization of nutrient stores from shallow roots and overstory crowns being consumed (Graham, 1999). Rooting strength on unstable soils is also reduced with the loss of deeper rooted

species and potential loss of larger, deeply rooted individual trees in a stand replacing event.

3. Forest Structure - In southwest Oregon, old growth typically developed in presence of, rather than the absence of fire disturbance (Agee, 2000). The absence of fire, as well as timber harvest has decreased the abundance of some old growth types, dependant on frequent low intensity fires that maintain a fire resistant structure. Forest types that are less fire resistant have become more widely distributed. The stability of late-successional habitat is at risk without proactive fire management within the dry provinces (FSEIS, 1994). When a large stand replacement fire occurs, a sudden loss of late and mature seral forests would result, as would some losses of the timber resource on Matrix lands. Re-establishment of late seral conditions would take approximately 80-100 years.

c) Irreversible or Irretrievable commitment of resources.

None anticipated

d) Cumulative Effects on Fuels Hazard Reduction

The FSEIS (3&4-84) identifies that the risk for catastrophic habitat losses from fire are high for dry provinces such as the area defined by the Lower Big Butte watershed. Based on the cumulative trend for all vegetative communities, there is an increasing potential for large, destructive fires to occur. At the landscape level, more of these fires would have long term effects on both terrestrial and aquatic ecosystems.

1.4. WILDLIFE

a) Direct and Indirect Effects

Threatened and Endangered Species

The No Action Alternative would have "no effect" on the Northern spotted owl. Habitat would remain at current levels. In some of the areas where dense stands of thick conifer are present, no action would result in slower development of larger overstory trees due to competition for light, nutrients, and moisture. In some cases, there is high fire risk due to high amounts of ladder fuels and tight canopies. This could leave adjacent spotted owl habitat at higher risk of being burned if a wildfire were to occur in the area.

Large old growth trees across the canyon from the bald eagle nest would be available for potential nest structures and roost perches. Potential for snags to provide roost and perch sites in the vicinity would continue at present rates.

Other Wildlife

Current trends of wildlife habitat and wildlife populations would continue with no action. Skid trails would not be built and current levels of habitat would remain to develop naturally. Coarse woody debris and snag numbers would increase due to some disease within the watershed. This would benefit species which depend on snags and coarse wood.

Great gray owl buffer areas adjacent to meadows where smaller understory conifers are dense and crowded together would not be entered. Great gray owl habitat near the meadows where the dense understory conifers are a barrier to flight from the forest to the meadows would remain. Conifers would continue to encroach into the meadows.

Oak woodlands/chaparral/grassland
Without prescribed fire, current trends in the oak woodlands and wedgeleaf chaparral would continue. In sections 17 and 20, T35S, R2E, the large areas of mature wedgeleaf would continue to develop and wildlife forage would continue to decline. Open grasslands would not have the flush of nutrients which occur after a fire. Proposed seeding of native grasses would not occur. Noxious weed species would continue to dominate the grasslands. Conifers would continue to encroach into the oak woodlands/oak savannah. Grassland would be slowly converted to shrub fields.

b) Short-term Uses vs. Long-term Productivity
Timber harvest would not occur and there would be no loss of habitat for late successional dependent species. There would be an expected long term increase in productivity for the late successional dependent species. Some areas which would not be thinned or burned would develop late successional characteristics more slowly, especially in the oak woodlands. There would be no loss of patches of old growth habitat.

c) Irreversible or Irretrievable Commitments of Resources
None identified.

d) Cumulative Effects
No change from expected current trends within the watershed.

1.5. Hydrology/Water Quality

a) Direct and Indirect Effects
Under the No Action Alternative, there would be no silvicultural treatments, fuels treatments, road improvements, road decommissioning, road building, or removal of culverts. Under this alternative, there would be no direct effects on the hydrology of this project area.

The indirect effects under the no action alternative would maintain the current condition of the watershed and cumulative effects of past management practices. Roads would not be improved, renovated, or temporarily blocked. Unimproved roads would continue to erode and transport sediment to streams. Inadequate drainage structures would continue the current level of sedimentation.

This alternative would not treat those units identified as having a high fire hazard. This maintains the current high risk for having a high intensity wild fire within this project area. A severe wild fire would increase soil erosion and subsequent stream sedimentation, channel down cutting, and increased water temperatures much greater than by treating these units mechanically or with prescribed fire.

b) Short-term Uses vs. Long-term Productivity
Under the No Action Alternative, there would be no change in long-term productivity for the hydrology of the area.

c) Irreversible or Irretrievable Commitments of Resources
None anticipated

d) Cumulative Effects

Under this alternative, the current conditions of the watershed would be maintained. High road density and unimproved roads would continue to supply sediment to stream channels at the current level and could increase if roads with improper drainage continue to erode. The current fuel loading conditions and high level of risk for a high intensity wildfire would also be maintained. High intensity wildfires can result in erosion and subsequent sedimentation to stream channels especially if there is above average precipitation. The impact of this disturbance generally lasts a short time due to the rapid regrowth of vegetation which soon covers the surface with plant litter thereby reducing the potential for erosion.

1.6. Aquatic Habitat/Fisheries

a) Direct and Indirect Effects

Under the No Action Alternative, no timber harvest, fuels treatments, riparian thinning, road decommissioning, or culvert removal would take place. Roads which are currently contributing sediment to the stream system would be left in their existing condition. Road densities would remain unacceptably high within the watershed. The Riparian Reserves vegetation would continue to grow at a slow rate due to overstocked, dense stands and would remain at high risk of a catastrophic stand-replacement fire. The culvert identified for removal would continue to block fish passage on Clark Creek.

Indirectly, the vegetation within the Riparian Reserve would continue to develop and provide the long-term necessary elements for healthy aquatic ecosystems. In areas where the Riparian Reserve is currently in an early to mid-successional condition it would be expected that late-successional characteristics would develop at a naturally slow rate. This would be expected to increase the length of time before the beneficial effects of a late-successional forest condition in these areas would be expressed in fish-bearing stream reaches.

This alternative would maintain current degraded aquatic habitat conditions and fish passage barriers. Maintaining this current situation would be expected to indirectly result in the continued negative effects of reduced freshwater survival of salmonids and delayed or obstructed fish migration.

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

b) Short -term Uses vs. Long-term Productivity

No measurable change to the current trend in long-term productivity (5-20 years) of fisheries and aquatic resources is anticipated by maintaining the current Riparian Reserve vegetation condition in the proposed project area. This alternative would continue to provide the long-term necessary elements for healthy riparian and aquatic ecosystems and would be anticipated to maintain or increase the current productivity of fisheries and aquatic resources over the long-term.

By delaying or foregoing road decommissioning, road renovation, and road maintenance in the short-term (1-5 years), a higher risk of stream sedimentation from roads is likely in the long-term

(>5 years). Current levels of stream sedimentation would be maintained or could increase. This would be expected to negatively affect aquatic habitat and, subsequently, the productivity of fisheries and aquatic resources in the watershed over the long-term.

By foregoing culvert removal it would be expected that negative fish passage and aquatic habitat connectivity conditions would continue. This would limit access to additional aquatic habitat in the proposed project area until the next replacement rotation (~30 years). This would be expected to maintain current levels of fish production over the short-term (<5 years).

Foregoing the fuels reduction actions in the project area would continue to maintain the current fuels densities created by years of fire suppression in these watersheds. Current levels of forest nutrient cycling and riparian vegetation condition would be maintained. This would be expected to maintain current levels of fish production over the long-term.

c) Irreversible or Irretrievable Commitments of Resources

None anticipated.

d) Cumulative Effects

A positive cumulative effect should result due to increased sizes and amounts of large wood contributed to the aquatic ecosystem as the Riparian Reserve vegetation develops and delivers material to the streams over the long-term. However, the early and mid-successional condition within portions of the Riparian Reserve would be maintained in the short-term and delay the time frame for these stands to make a long-term positive contribution of large wood to the aquatic ecosystem.

Due to the lack of road maintenance or renovation, current levels of stream sedimentation could be increased. Some roads may stabilize over time as they revegetate 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. The lack of preventive road maintenance and renovation would be expected to have a negative cumulative effect on fisheries and aquatic resources.

Foregoing the fuels treatments would continue to maintain current riparian vegetation conditions. This would maintain the current rate of recruitment of large wood due to stand density conditions and slower nutrient cycling. This would be expected to delay the time frame for these stands to make a long-term positive contribution of large wood to the aquatic ecosystem, resulting in a continued lack of instream structure, habitat diversity, and protective cover needed by fish and creating a negative cumulative effect upon fisheries and aquatic resources.

e) Determination of Effects on Southern Oregon/Northern California (SONC) Coho Salmon and SONC Critical Habitat from Implementation of the No Action Alternative.

May Affect, Likely to Adversely Affect

Due to the current degraded condition of aquatic habitat within the Big Butte Creek watershed, it would be expected that further degradation would occur from potential sediment delivery to streams from the existing road system. The No Action Alternative is

likely to result in more than a negligible chance of "take" of these species. As a result, the No Action Alternative is considered "likely to adversely affect" SONC coho salmon (listed "threatened") and SONC critical habitat.

C. Effects of Implementing Action Alternative 2

2.1. Vegetation

a) Direct and Indirect Effects

Conifer dominated stands identified for thinning or selective cutting (approximately 1,970 acres) would have smaller and less vigorous trees harvested. Approximately 1,370 acres would have densities reduced to a level where individual tree growth is enhanced (relative densities of 35%-45%). Removal of smaller less vigorous trees would increase crown base heights, reduce ladder fuels and crown bulk densities with residual canopy closures ranging between 40 to 60%. The result of these changes is that seral species would be favored as a stand component and the development of larger diameter and taller trees would be enhanced so that the characteristics of a mature stand are developed faster. Stand vigor and growth would be maximized with density levels at full site occupancy. Approximately 600 acres being treated however would have lower levels of density reduction. This would occur in more developed stands in which the objective of 60% canopy closure for crown fire reduction and/or removal of only 8 inches dbh or smaller trees for ladder fuel reduction would result in relative density levels of 50% and greater being retained. The resulting densities would provide for minimal to potentially no improvement in individual tree growth. This is due to residual stocking levels being at or near the point where self thinning occurs (60% relative density). In these areas stand vigor and condition would be maintained for the short term (5 to 10 years).

Pure conifer stands identified for underburning (170 acres), would also have minimal to no change in stand densities. Some reduction of understory competition would occur which would simplify stand structures to more of a single storied condition, The overall canopy cover of overstory components would be similar to that of understory thinning in more developed conifer stands.

Stands identified for hardwood conversion (50 acres) would have Pacific madrone removed to favor the retention and additional establishment of conifer species. This would create an early seral condition in which stand vigor and growth would be maximized for conifer species. Canopy closure would be reduced from 60-80% to 20-40%.

In stands identified for regeneration harvests (220 acres), variable levels of vigorous green trees greater than 20 inches dbh would be retained. Canopy closure would be reduced to 10-40% depending on the level of green tree retention. Structural diversity would be reduced, canopy layers would be limited to the residual overstory trees, trees less than 8 inches dbh and scattered vigorous trees 8-20 inches dbh Herbaceous, shrub and tree species composition would be shifted toward shade intolerant species, reversing the current trend towards shade tolerant species.

Oak/pine woodlands (1530 acres) would have smaller trees and encroaching understory conifers & shrubs removed making more resources available for improved growth of remaining trees. Stand structure would be altered such that, overstory trees could withstand a wildfire event. Canopy closures in areas of consistent stocking would be approximately 60%.

Treatment in shrub lands (1,000 ac.) and grasslands (410 ac.) would result in reduced cover across ⅓ to ⅔ of a given area immediately following treatment activities. This would create a starker contrast in vegetative variability where vegetation is removed. Prescribed fire would create a flush of nutrients and seeding of native grasses (approximately 1,000 ac.) would provide for a shift in vegetative species components.

Approximately 10 acres of the 29 acre ACEC would be treated with controlled fire in late spring or mid winter. It is anticipated that only the mounded areas would burn within the project area effectively creating a patchwork of burned and unburned areas. The object is to simulate an early summer burn when soil moisture is still relatively high, especially in the ACEC and large areas would be protected by seasonal streams or a mid winter burn when water protects Meadow Foam habitat. A creeping, low-intensity fire is expected with flame lengths approximately 1 foot in height. Areas where sensitive plants occur in the inter-mound areas would receive a quick, light burn, or be left unburnt. The project area would be evaluated for re-treatment within 3 years.

b) Short-term Uses vs. Long-term Productivity

Commodity production of commercial forest products and improved stand vigor over the short term and long term is the greatest under this alternative. In the short-term, the vigor of thinned and selectively cut stands would be increased. The long-term productivity would be expected to increase due to increased stand vigor and species diversity being maintained or increased. On Matrix lands retention of remnant mature overstory trees would be at a lower level when compared to all other alternatives as many of these trees would be removed to redistribute growth to more vigorous dominant and co-dominant trees.

In the regeneration harvests and hardwood conversion treatments, overstory trees would provide for structural and biological legacies. The species mix and density level of planted trees would trend towards the plant communities and stocking levels that historically would have been present. Late successional characteristics would be expected to redevelop in approximately 80 years.

Compared to the no action alternative, woodlands, shrublands and grasslands would have a shift in cover continuity as a result of treatment actions. This would provide for a short-term increase in forage palatability, a reduction in fuel continuity and an increase in native grasses. Over the long-term these attributes would be expected to decline without additional disturbance to the vegetative succession process.

c) Irreversible or Irretrievable Commitments of Resources

None anticipated.

d) Cumulative Effects

Treatment under this alternative would result in stands which are more vigorous, healthy and resilient to environmental changes. Stand growth and vigor across the analysis area would be maximized to a greater extent than other alternatives being considered. Stand susceptibility to insect attack, disease infection and fire would also be expected to be reduced across more total acreage than with other alternatives. Species composition would shift towards drought and fire tolerant species. Species diversity would be increased, but structural diversity would be somewhat simplified due to placing growth emphasis on dominant and co-dominant trees in stands to be thinned. In true conifer stands, an estimated 270 acres would shift from a late or mature seral

condition to an early seral condition. Approximately 1,370 acres would be treated to enhance late seral development and 770 acres would have treatments to maintain existing seral conditions in the short term.

Across the watershed, habitat components provided in woodlands, shrublands, and grasslands would be represented by both early and later seral stages. Representation of native grasses would be increased, and treatments would work to cumulatively reduce fire intensities at the landscape level.

2.2. Fuels Hazard Reduction

a) Direct and Indirect Effects

Under this alternative approximately 5,330 acres of treatment would occur across a variety of vegetation types using various methods (see Vegetation section). These treatments would have a direct effect to existing fuels and associated fire risks. Thinning or density management in general, would emphasize removing smaller and less vigorous trees. With follow-up slash treatments, this would reduce ladder fuels and surface fuels with canopy closures reduced to 70% or less. As a result the potential for crown fire activity would be greatly reduced or eliminated for those stands treated. Thinning provides opportunities to retain larger individual trees and/or fire resistant species, such as pine. The resistance and resiliency of these stands, to withstand surface fires would be increased as a result. Understory thinning would provide similar results in early to mid seral stands (0-11 inches dbh). In more developed stands however, understory thinning would generally retain canopy closures at or above 70%. As a result, the potential for fire moving from the surface to the crowns would be reduced from the thinning, but canopy closures would remain high enough for a crown fire to occur, should it reach the crowns. This effect is similar for timber stands where underburning would occur.

In stands identified for selection cutting, canopy closure and surface fuels would be reduced as described for thinning treatments. Ladder fuels would also be reduced, but unlike thinning treatments, trees across all size classes would be retained. As a result, localized crowning and torching of individual trees are still a risk for these stands. Stocking reduction and opportunities to favor specific seral tree species (ie.pine and cedar), would improve the resilience and resistance of these stands to fire when compared to the existing condition.

In stands identified for regeneration harvest, the reduction of a multi-layered, low vigor stand condition would result in a dramatic reduction in fire hazard.

Treatments within oak/pine woodlands and brush fields would reduce current high or very high fuel hazard conditions. The risk of high fire intensities would be reduced if a wild fire were to occur. Although, wildfire spread rates would remain high, fires would be easier to control.

Treatments within grasslands would be done to accomplish a shift from annual grasses to preferred perennial grasses. Although, this would have no real change in fire behavior or intensity when grasses are cured, perennials tend to cure later in the year and have established root systems capable of re-sprouting. As a result, the period of time grasslands are at risk to fire may be shortened and resilience of response following a fire would be higher.

b) Short Term Uses vs long-term Productivity

In the short term fire hazard would be reduced. To maintain this reduction, fuels treatment would need to be maintained. Depending on the level of thinning and vigor of the residual stands, stands which are thinned or underburned could be expected to have canopy re-growth which could result in crown fire risk in 10 to 30 years. Likewise, stands which have ladder fuels reduced but retain high stocking levels would be expected to self thin. This would provide for gradual increases in surface fuel loadings. Although regeneration harvests would have a dramatic reduction in fire hazard and intensities, this would increase as seedlings, brush and grass develop to establish a multi-layered fuel structure in approximately 20 years.

The potential for large scale fires over the project area would be decreased, resulting in a reduced risk of long term productivity losses to resource values which are at risk to catastrophic events.

c) Irreversible or Irretrievable commitment of resources.

None anticipated

d) Cumulative Effects

Treatments would result in a shift in fuel models throughout the watershed. Fuel models 4 and 6 which have a high expected fire intensity level would be altered to a condition where low to moderate fire intensities would be expected (see BLM Intensity Ranking Table). Although high risk fuel conditions would remain present in the watershed, concentration of treatments in strategic areas would work to provide effective breaks in fuel continuity from upland and lowland areas. Shifts in fuel structures in these areas would make it possible for suppression efforts to be more successful. The result is reduced risk of fire spread between upland and lowland areas within the watershed. Specific strategy areas being treated to cumulatively reduce the potential of large fire spread include:

1. Treatment of vegetation adjacent to mid slope grasslands running from Fredenburg Butte to the edge of the Clark Creek watershed as well as an area to the east of Netherlands Road. Cumulatively, treatment in these locations would reduce fire spread potential between the lowlands along Big Butte Creek and upland areas in the in the northeast portion of the watershed.

2. Treatment of contiguous buckbrush fields (*ceanothus cuneatus*), oak woodlands and conifer stands adjacent to private residences along Cobleigh Road. Cumulatively treatments would reduce fire spread potential between urban interface areas and adjacent wildlands.

3. Treatment of a variety of vegetation types to the west of Crowfoot Road to provide for reduced fire spread potential between the Crowfoot Road area and the adjacent Camel Hump area to the west of the watershed.

4. Treatment of a variety of vegetation types to the south of the Butte Falls Highway. Treatments are concentrated adjacent to the Eagle Point irrigation canal, Medford Water District roads and along the watershed divide. Cumulatively, this would contribute towards reducing the potential for large fire spread between urban interface areas along the Butte Falls Highway and uplands as well as the Big Butte and Little Butte watershed.

5. Treatment of scattered blocks of vegetation adjacent to areas identified as urban interface.

Cumulatively treatments would reduce fire spread potential between urban interface areas and adjacent wild lands.

2.4. Wildlife

a) Direct and Indirect Effects

Threatened and Endangered Species

This alternative would likely adversely affect the Northern spotted owl. Consultation with USFW has been completed and the action meets the FSEIS and RMP ROD guidelines. A ¼ mile seasonal restriction would be in place to reduce noise and activity disturbance to the active spotted owl sites.

Under Alternative 2, one unit with a spotted owl pair without an activity center has been proposed for regeneration harvest. This would remove approximately 32 acres of old growth habitat. The loss of habitat and the thinning proposed in the adjacent stand would force the owls to relocate. The site would be monitored prior to beginning the action, and a seasonal restriction would be in effect from March 1 through September 30. The pair does not have a 100 acre activity center designated, because it was discovered after January 1, 1994. This is consistent with the NFP.

Alternative 2 would have the greatest impact to spotted owls of the 4 alternatives considered. This alternative would reduce suitable spotted owl habitat (nesting/foraging/roosting and foraging/roosting) the greatest amount of the three action proposals. Approximately 1,310 acres of suitable spotted owl habitat would be entered. Regeneration harvest would remove 123 acres of spotted owl habitat. 107 acres of nesting habitat would be downgraded to roosting/foraging, and 748 acres would be downgraded from suitable to dispersal habitat.

In section 25, T34S, R1E, one unit proposed for select cut/commercial thin is within ¼ mile of the eagle nest. No action is proposed in the nest stand. Thinning by removing the competing smaller trees is expected to increase the growth of overstory trees, improving the potential for future large conifer to the north of the nest. A seasonal restriction from January 1-August 31 would be in effect for actions within ¼ mile of the nest if it is active (½ mile for line-of-sight). No eagle perches within ½ mile of nests or roosts would be cut.

Other Wildlife

Snags may need to be felled for safety reasons under all proposed action alternatives. These would be left on site to provide coarse wood. This could result in the loss of cavity nester habitat, and could disrupt the nesting/breeding cycle for some species, mammals as well as birds.

Cover and nesting substrate for birds would also be removed. Loss of old growth habitat in two units would reduce this type of habitat to the greatest extent of the three proposed action alternatives. Buffers for the survey and manage species (fungi, lichens, and plants) would preserve small patches of habitat for hiding cover and nesting birds, see silviculture prescription Appendix E. Intact patches of understory trees would be left in the units to provide thickets for nesting. This would provide an understory patch of shrubs and small trees which would provide >40% cover. At least two patches, (approximately 1 acre) would be left for each 10 acres entered.

Some species of birds would benefit from the density management, thinning from below. Birds such as Hammond's flycatcher which are aerial insectivores require open areas beneath the forest

canopy for adequate foraging space, because a low tree density allows clear flight paths to capture flying insects.

Prescribed fire in late spring could result in the loss of some bird nests. Prescribed fire would occur when conditions are wet, mostly early in the spring before nesting is established, although some areas may not be dry enough to burn until later in the spring. This could cause the loss of the breeding opportunity for that year. Spring burning often creates a mosaic with patches of brush and cover which do not burn due to moisture conditions, but the loss of some bird habitat and potentially, nestlings would be expected. No more than a ⅓ of an area would be burned in any one year, to protect patches of nesting habitat.

The proposed action, while affecting local individuals and causing the loss of habitat, and possibly disrupting the nesting cycle in the year the action occurred, would not be expected to affect the long- term viability of the neo-tropical bird population.
Prescribed fire would improve conditions in the meadows and wedgeleaf patches. Open grasslands would have a flush of nutrients as a result of prescribed fire. Conifer encroachment would be reduced in the areas where prescribed fire intensity would kill small conifers.

Great gray owl habitat within the regeneration harvest units and areas where large overstory trees are removed would be reduced. Loss of habitat for great gray owls would be the greatest under alternative 2. Pre-commercial thinning of small trees within the 300 foot meadow buffer would occur. This would improve the area for flight and reduce the encroachment of conifers into the meadows, and would be expected to improve growth in the larger overstory trees due to less competition from the understory trees.

b) Short-term Uses vs. Long-term Productivity

Timber harvest under Alternative 2 would result in loss of the greatest amount of habitat for late successional forest dependent species. These species would not be expected to recover until late successional conditions re-occur, perhaps 80-100 years.

There would be an expected reduction of forage for grazing and shrub browsers in the short term due to fire. However, this would improve when re-growth occurs. Observations from past prescribed fire projects in the Butte Falls Resource Area shows that new growth usually begins as soon as the fall or spring rains soak the soil. Deer and elk move into the areas as soon as the grass begins to grow.

Cover would be reduced in the wedgeleaf areas as a result of the crushing action. Native grasses would be planted in some areas proposed to be burned. This would help re-establish the native grasses and reduce the noxious weeds in areas where they are able to out-compete the non-native species. In the long term, re-establishment of native grasses would improve forage for wildlife, including birds. Patches of brush inside the units and along the edges would be left for hiding cover and nesting habitat for birds.

c) Irreversible or Irretrievable Commitments of Resources

No irreversible effects identified. Irretrievable commitments would be loss of approximately 200 acres of old growth trees proposed for regeneration harvest. Since the lands are currently Matrix land allocation and are expected to be managed for timber production, it is unlikely that these acres

would provide habitat for old growth (200+ years) species. Habitat and connectivity for late-successional species would be provided by Riparian Reserves and LSR patches in the Matrix.

d) Cumulative Effects

No acres are proposed for regeneration harvest in the connectivity block. Proposed harvest would occur within Matrix lands and meets ROD standards and guidelines for timber harvest on federal lands. Proposed thinning in riparian reserves would not remove large overstory trees, but would target small understory and suppressed trees to improve tree growth to attain the larger diameter in these areas. This should have no impacts to the function of the riparian reserve for wildlife dispersal.

The greatest loss of late successional habitat would occur as a result of the proposed timber harvest in Alternative 2. Two patches of old growth timber in section T35S, R1E, section 25 and T35S, R2E, section 17 have been identified as regeneration units. These areas are low elevation old growth forest. These would be entered for regeneration harvest under Alternative 2, but reserved from harvest in Alternatives 3 and 5. Old growth in the watershed is rare, and the proposed action would result in the loss of approximately 70 acres of the remaining low elevation old growth in the Lower Big Butte watershed.

Most private timberlands in the Lower Big Butte watershed have been harvested and are either shrub, pole, or large pole conditions. These lands provide habitat for birds which use pole, shrub, and pole stands. Very little mature timber on private lands remains in the area. Due to the high amount of early seral forest on adjoining private lands, past harvest practices on BLM lands, natural fragmentation in the watershed, and proposed regeneration units in this alternative, there would be small islands of late successional habitat in the landscape provided by the spotted owl activity centers, connectivity block reserved acres, and riparian reserves.

2.5 Hydrology/Water Quality

a) Direct and Indirect Effects

Direct effects on the hydrology are not expected as a result of the proposed timber harvest treatments within the project area. Riparian Reserves would prevent sediment from reaching stream channels and maintain current levels of riparian vegetation to provide shade for stream channels.

Indirect effects on the hydrology of the project area is related to roads and road use. An increase in the availability of sediments that can be eroded often comes from the construction and use of roads in forested watersheds. There are two main processes associated with significant increases in road related sediment, mass failure and surface erosion. The total road density of the project area is considered high at 4.5 miles per square mile.

There is 1.0 mile of permanent road and 2.5 miles of temporary road proposed to be constructed with this alternative. Some erodible sediment may be transported at first, but road construction would occur outside of riparian areas and is not likely to transport sediment to streams. Road improvements and renovations may cause some short term movement of sediment but these treatments are expected to decrease the amount of erodable sediments moving in this project area.

b) Short-term Uses vs. Long-term Productivity

Under this alternative, there would be no changes in the long-term productivity on the hydrology of the area.

c) Irreversible or Irretrievable Commitments of Resources

None anticipated

d) Cumulative Effects

Cumulative effects from this alternative are expected to be negligible at the 5th field watershed scale and minimal at the 6th field subwatershed level. There is no net increase of roads in the project area. Improvements and renovations to existing roads are expected to reduce the amount of sediment currently being transported to stream channels. Also, the existing level of open roads would be reduced greatly by temporarily closing over 20 miles of road. Although these actions would not significantly reduce the road density in the analysis area, the amount of sediment produced from traffic would be greatly reduced.

The majority of treated acres within the project area are either hand treatments or slashbuster for fuel hazard reduction. These treatments result in very low amounts of vegetation removal or compaction which would limit erosion.

No openings would be created within the riparian area. Therefore, solar radiation on the stream channels would not be increased .

The timing and amount of peak flows are not expected to change as a result of the timber harvest portion of this project. The majority of the treatments involve the thinning of trees to reduce the fire hazard and competition within stands that are determined to be too dense. These thinning projects generally increase the amount of water available, but the remaining vegetation is expected to utilize this increased availability of water. Since the amount of regeneration harvest that is proposed only impacts 1.1% of Big Butte Middle subwatershed, 0.38% of McNeil Creek subwatershed, and 0.05% of Little Butte- Lick subwatershed it is not possible to separate out these cumulative effects from natural variability.

The treatments that are proposed within the Transient Snow Zone (TSZ) where Rain On Snow (ROS) events are of concern all occur within the Big Butte Middle subwatershed. The TSZ in Big Butte Middle subwatershed is considered to be 82.7% hydrologically recovered. An area is considered to be at full hydrologic recovery at 70%. Timber harvest methods that create large openings (>2 acres) can increase the magnitude of flows when a significant ROS event occurs. The amount of large openings in this project are expected to come from regeneration harvests which would affect 2.4% of the TSZ. This is considered to be an acceptable level due to the rapid regrowth of vegetation, the low probability that a major event would occur within the time expected to regain full hydrologic recovery on those acres, and the stability of streams in this area to withstand high energies.

Hydrologic Recovery	Percent of Area Hydrologically Recovered	
Analysis Area	All Lands	Transient Snow Zone
Lower Big Butte	71.0	79.0*(Ave from 3 WS)
McNeil Creek	65.8	81.4
Big Butte Creek, Middle	77.1	82.7
Clark Creek	73.1	73.4
Big Butte, Lower	69.9	NA

2.6 Aquatic Habitat/Fisheries

a) Direct and Indirect Effects

No direct effects to fish and aquatic habitat are expected from the proposed timber harvest and fuels treatment activities. Indirect effects which may result from timber harvest could include increased runoff due to reduced canopy cover and soil compaction by heavy equipment operation. This could result in a change in the magnitude or timing of flows in adjacent streams. However, based upon the limited amount of harvest proposed, and due to the project's design these effects are expected to be inconsequential and immeasurable. Most harvest units are designated for density management or select cut treatment which would leave a residual canopy closure of 40-60%. This would be expected to maintain the current hydrologic functioning condition of the upland areas. The regeneration harvest would not be expected to measurably affect flows within the project area because of the small number of acres proposed for treatment.

Within the two areas designated for riparian thinning, no-treatment buffers would be maintained to reduce the potential for sediment delivery into the streams. The width of these buffers is based upon the steepness of the adjacent slopes and the presence of true riparian vegetation species. There would be no measurable reduction in shade on these streams resulting from the proposed thinning. Since all treatments within these riparian thinning units would be thinned using hand-held equipment, there would be no soil compaction occurring as a result of treatment. No heavy mechanical equipment would be allowed within the Riparian Reserves except on those roads which are already in existence, and at designated crossings on intermittent streams within the slash-buster units. Crossings would be limited to areas where the streamside vegetation and banks would suffer the least amount of impact, and would be timed to occur when the streams are dry.

Indirectly, the vegetation within the Riparian Reserves would continue to develop and provide the long-term necessary elements for healthy aquatic ecosystems. In areas where the Riparian Reserve is currently in an early to mid-successional condition it would be expected that late-successional characteristics would develop at a naturally slow rate. This would be expected to increase the length of time before the beneficial effects of a late-successional forest condition in these areas would be expressed in fish-bearing stream reaches. The areas designated for riparian thinning would be expected to achieve late-successional structural characteristics within a shorter time period by reducing the competition for light and nutrients within these stands. Thinning would also indirectly result in increased resistance to a stand-replacement fire.

b) Short -term Uses vs. Long-term Productivity

No measurable change to the current trend in long-term productivity (50-100+ years) of fisheries and aquatic resources is anticipated by maintaining the current Riparian Reserve vegetation condition in the proposed project area. This alternative would continue to provide the long-term necessary elements for healthy riparian and aquatic ecosystems and would be anticipated to maintain or increase the current productivity of fisheries and aquatic resources over the long-term.

The proposed road decommissioning and culvert removal would be expected to have a short-term negative effect on some streams within the project area due to the release of sediment during construction and decommissioning. These effects are expected to be negligible due to the implementation of Best Management Practices (BMPs) and Project Design Features (PDFs) which would prevent most, if not all, of the sediment from reaching the stream channels. The long-term benefits of these activities on aquatic habitats are expected to offset any of the short-term negative effects. Overall sedimentation should be reduced in the long-term as a result of implementing these projects.

c) Irreversible or Irretrievable Commitments of Resources

None anticipated.

d) Cumulative Effects

A positive cumulative effect should result due to increased sizes and amounts of large wood contributed to the aquatic ecosystem as the Riparian Reserve vegetation develops and delivers material to the streams over the long-term. However, the early and mid-successional condition within portions of the Riparian Reserve which are not designated for thinning would be maintained in the short-term and delay the time frame for these stands to make a long-term positive contribution of large wood to the aquatic ecosystem.

Cumulative effects to the watershed from the proposed timber harvest and fuels treatments would include the reduction in vegetative cover and possible related short-term effects on flows. The recovery of vegetative cover within the grasslands and brush fields is expected to occur within a year or two at the most, with an overall benefit provided to the watershed by reducing risks of catastrophic fire. By reducing vegetative cover through these treatments it is expected to provide a long-term benefit to aquatic resources by reducing risks of sedimentation resulting from extreme fire behavior on the landscape.

A positive cumulative effect should also result due to the reduction in road densities following road decommissioning. However, this is also dependent upon the actions taken on private lands within the watershed, and may be offset by additional road-building occurring on these properties.

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

May Affect, Not Likely to Adversely Affect

Informal consultation with the National Marine Fisheries Service (NMFS) was initiated in June 2001 for SONC coho salmon and SONC Critical Habitat.

D. Effects from Implementing Alternative 3

3.1. Vegetation

a) Direct and Indirect Effects

Like Alternative 2, conifer stands identified for thinning and selective cutting (approximately 2,060 acres) would have smaller and less vigorous trees harvested. Approximately 1,430 acres would have densities reduced to a level where individual tree growth is enhanced (relative densities of 35%-45% with canopy retention of 40% to 60%). The remaining 630 acres being treated emphasizes reducing crown fire potential only. This would result in lower levels of density reduction with minimal to no improvement in individual tree growth or vigor (relative densities of 50% or greater with canopy retention of 60% or greater). In more heavily thinned stands, vigor and growth would approach maximum, but unlike Alternative 2, retention of remnant mature overstory trees would be emphasized to retain and promote late successional structures.

Pure conifer stands identified for underburning (180 acres) would also have minimal to no change in stand densities. Some reduction of understory competition would occur which would simplify stand structures to more of a single storied condition, but the overall canopy cover of overstory components would be similar to that of understory thinning in more developed conifer stands.

Mature and deteriorating stands in general would not be entered under this alternative and like Alternative 1, remain on the landscape in their current condition. Approximately 30 acres, however, would be treated retaining 6-8 green conifers/acre, greater than 20 inches dbh. Structural diversity would be reduced, canopy layers would be limited to the residual overstory trees, trees less than 8 inches dbh and scattered vigorous trees 8-20 inches dbh.

Oak/pine woodlands (1,530 acres) would have smaller trees and encroaching understory conifers and shrubs removed, making more resources available for improved growth of remaining trees. Stand structure would be altered such that overstory trees could withstand a wildfire event. Canopy closures in areas of consistent stocking would be approximately 60%.

Same as Alternative 2 for the ACEC.

b) Short-term Uses vs. Long-term Productivity

In the short-term, the vigor of thinned and selectively cut stands would be increased to near maximum levels. The long-term productivity would be expected to increase due to increased stand vigor and species diversity being maintained or increased. Retention of remnant mature overstory trees in mid to late seral stands would be higher than under Alternative 2 but initially lower compared to the No Action Alternative and Alternative 5. Compared to all alternatives, presence of larger diameter overstory trees is expected to be higher in the long-term due to reduced competition from mid-story conifers and an increased potential for ingrowth as a result of stocking reduction. In the short-term, mature stands left untreated would provide for a greater level of late seral stand structure retention across the landscape. The long term effect of this would be similar to the no action alternative. Eventually, due to dense and deteriorating stand conditions, the probability of insect infestations and disease infections would be greater. As a result, these stands would be expected to have a decrease in long term productivity.

c) Irreversible or Irretrievable Commitments of Resources

None are anticipated.

d) Cumulative Effects

Treatment under this alternative would result in stands which are more vigorous, healthy and resilient to environmental changes than present conditions. Stand susceptibility to insect attack, disease infection and fire would be expected to be reduced. Retention and development of later seral conditions would be highest under this alternative. In true conifer stands, an estimated 30 acres would shift from a late or mature seral condition to an early seral condition. Approximately 1,430 acres treated would enhance stand vigor and promote late seral development and 810 acres would have treatments to maintain existing seral conditions while reducing potential loss from wildfire.

3.2. Fire and Fuels

a) Direct & Indirect Effects

Under this alternative approximately 5,200 acres of treatment would occur across a variety of vegetation types using various methods (see Vegetation section). These treatments would have the same effects as that described for Alternative 2. The primary difference between this alternative and Alternative 2 is that stands identified for regeneration harvest have been deferred. In these stands, conditions would remain unchanged and the associated fire risks would be as described in Alternative 1.

b) Short Term Uses vs Long-Term Productivity

Like Alternative 2, in the short term fire hazard would be reduced. To maintain this reduction, fuels treatment would need to be maintained. The potential for large scale fires over the project area would be lessened, resulting in a reduced risk of long term productivity losses to resource values which are at risk to catastrophic events.

c) Irreversible or Irretrievable commitment of resources

None anticipated

d) Cumulative Effects

Cumulatively, treatments would result in a shift in fuel models and expected fire intensities throughout the watershed as described for Alternative 2, (see BLM Intensity Ranking Table). Compared to Alternative 2, there is only a slight increase in area (approximately120 acres) which remain classified as having high expected fire intensities. This is reflective of regeneration harvests being deferred. Within strategy areas, cumulative changes in fuel continuity to reduce the potential of large fire spread is as described for Alternative 2.

3.4. Wildlife

a) Direct and Indirect Effects

Threatened and Endangered Species

Under Alternative 3, regeneration harvest would ***not*** occur on the west side of Big Butte Creek in section 25, T34S, R1E. The patch of old growth habitat across the canyon from the eagle nest would be left intact. This would protect large conifer on the rim of the canyon above Big Butte

Creek and leave one of the remaining old growth forest patches in the low elevations in Lower Big Butte watershed. There would be an expected increase in the number of snags along the rim if timber harvest does not occur. These snags would provide eagle roost and perch trees above Big Butte Creek. Retention of the large Douglas-fir and pine trees on the west side of the creek would provide a patch of habitat with potential for future eagle nest sites.

As in Alternative 2, in section 25, one unit proposed for select cut/commercial thin harvest would occur within ¼ mile of the eagle nest. Thinning would occur in this area, but the larger trees and snags which provide suitable bald eagle habitat would not be removed. A seasonal restriction from January 1-August 31 would be in effect for actions within ¼ mile of the nest if it is active (½ mile for line-of-sight).

This alternative would likely adversely affect the Northern spotted owl. Approximately twenty seven acres of spotted owl suitable habitat would be removed with regeneration harvest. 107 acres of nesting/roosting/foraging habitat would be downgraded to roosting/foraging, and 718 acres would be moved from suitable habitat to dispersal habitat. Alterative 3 would protect more of the available spotted owl habitat than Alternative 2, but less than Alternative 5. A ¼ mile seasonal restriction would reduce noise and activity disturbance for the spotted owls and great gray owl nest if they are active.

Alternative 3 would protect the pair of spotted owl pair in section 25. Harvest in the unit would be deferred under Alternative 3. Under Alternative 2, the owls would be forced to move out of the area where they currently are found. Alternative 3 would protect a 32 acre patch of old growth forest where the owls were located in 2000. The adjacent stand would be thinned, the same as Alternative 2. This stand would remain dispersal habitat after the action.

The late successional forest where the owls are currently located is not large enough for the owls to establish a long term nesting site. However, deferring harvest in this patch of old growth habitat would provide an area suitable for spotted owls which are dispersing through the watershed.

Other Wildlife

Hardwood conversion in sections 11 and 13, T35S, R1E would not occur under Alternative 3. The stand would continue to be a dense hardwood stand with madrone, chinquapin, and oak with little conifer regeneration beneath the hardwood canopy. The area currently provides spotted owl roosting and foraging habitat. The patch of hardwoods provides birds and small mammals foraging and nesting opportunities.

Great gray owl habitat in harvest units where large overstory trees are removed would be reduced. Loss of habitat for great gray owls would be the less than Alternative 2, but greater than Alternative 5. Understory thinning of small trees within the 300 foot meadow buffer would occur in areas where thick understory vegetation would provide ladder fuels into the overstory. Cutting pre-commercial size trees would improve the area for flight and reduce the encroachment of conifers into the meadows, and would be expected to improve growth in the larger overstory trees due to less competition from the understory trees. No commercial harvest would occur within these buffers.

Cover and nesting substrate for some land birds would also be removed through this proposed

action, less than Alternative 2, but more than Alternative 5. Buffers for the survey and manage species (fungi, lichens, and plants) would preserve small patches of habitat which could be used for hiding cover and nesting birds. The proposed action, while affecting local individuals and causing the loss of habitat, and possibly disrupting the nesting cycle in the year the action occurred, would not have measurable effects to the populations of land birds.

Effects of prescribed fire would be the same as Alternative 2.

b) Short-term Uses vs. Long-term Productivity

In the regeneration harvest areas, loss of habitat for late successional forest dependent species would occur. These species would not be expected to recover until late successional conditions re-occur, perhaps 80-100 years. Since there would be less regeneration harvest with this proposed alternative, there would be less loss of late successional habitat than proposed Alternatives 2, but more than 5.

As in Alternative 2, there would be a reduction of forage in the short term due to fire disturbance before grasses and shrubs put out new growth. However, this would improve when growth occurs after the rains begin. Shrub cover would be reduced in the wedgeleaf areas in section 17, 19 and 20 as a result of the crushing action and prescribed fire.

c) Irreversible or Irretrievable Commitments of Resources

No irreversible effects identified. Irretrievable commitments would be loss of approximately 30 acres of old growth trees proposed for regeneration harvest. Since the lands are currently Matrix land allocation and are expected to be managed for timber production, it is unlikely that these acres would provide habitat for old growth (200+ years) species. Habitat and connectivity for late-successional species would be provided by Riparian Reserves and LSR patches in the Matrix.

d) Cumulative Effects

No acres are proposed for regeneration harvest in the connectivity block. Old growth forest patches identified in two areas, T34S, R1E, section 25 and T34S, R2E, section17 would be deferred from harvest at this time. This would provide patches of old growth legacy in the watershed. Private industry clearcutted the surrounding forest in the summer of 2000. Private industry has removed much of the large older forests on their lands within the watershed. Most of the private timber land in the watershed would be expected to remain in early to mid-seral condition.

3.5. Hydrology/Water Quality

a) Direct and Indirect Effects

Direct and indirect effects are expected to be essentially the same as those described in Alternative 2. The effects of roads would be slightly less in this alternative due to a lower amount of permanent and temporary roads.

b) Short-term Uses vs. Long-term Productivity

Under Alternative 3, there would be no changes in the long-term productivity on the hydrology of the area.

c) Irreversible or Irretrievable Commitments of Resources

None anticipated.

d) Cumulative Effects

The cumulative effects from this alternative are expected to be similar as those described in Alternative 2. However, the amount of regeneration harvest would be reduced significantly to 27.4 acres. This represents 0.22% of Big Butte Middle subwatershed with none of the acres in the TSZ. Due to this small change, it is not possible to separate the cumulative effects from natural variability. There is an extremely low level of risk associated with this level of treatment.

3.6. Aquatic Habitat/Fisheries

a) Direct and Indirect Effects

Same as the effects of Alternative 2.

b) Short -term Uses vs. Long-term Productivity

Same as the effects of Alternative 2.

c) Irreversible or Irretrievable Commitments of Resources

None anticipated.

d) Cumulative Effects

Same as the effects of Alternative 2.

e) Determination of Effects on Southern Oregon/Northern California (SONC) Coho Salmon and SONC Critical Habitat from Implementation of the Proposed Alternative.

May Affect, Not Likely to Adversely Affect

The effects of this alternative would be identical to those already identified in Alternative 2. Informal consultation with the National Marine Fisheries Service (NMFS) was initiated in June 2001 for SONC coho salmon and SONC Critical Habitat.

4. *Alternative Four Considered But Eliminated*

5.1. Vegetation

a) Direct and Indirect Effects

Like Alternatives 2 and 3, thinning of conifer stands (1,700 acres) would provide for reduced stand densities by removing smaller and less vigorous trees. Approximately 980 acres would have densities reduced to a level which promotes individual tree growth and vigor. Unlike Alternatives 2 and 3, commercial stocking reduction would only be accomplished to the level where residual canopy retention is at 60%. As a result, regardless of stand age or condition, densities would typically be reduced to a relative density of 45%. An estimated 720 acres however, would have lower levels of density reduction with minimal to no improvement in individual tree growth or vigor (relative densities of 50% or greater with canopy retention of 60% or greater). As described in Alternative 3, stands thinned to a 60% canopy cover and 45% relative density would provide for

accelerated development of mature stand characteristics and an overall increase in vigor and growth. Retention of remnant mature overstory trees would be emphasized to retain and promote late successional structures.

Conifer stands identified for underburning (180 acres) would also have minimal to no change in stand densities. Some reduction of understory competition would occur, this would simplify stand structures to more of a single storied condition. The overall canopy cover of overstory components would be similar to that of understory thinning in more developed conifer stands.

Oak/pine woodlands (1,530 acres) would have smaller trees and encroaching understory conifers and shrubs removed making more resources available for improved growth of remaining trees. Stand structure would be altered, such that, overstory trees could withstand a wildfire event. Canopy closures in areas of consistent stocking would be approximately 60%.

Same as Alternative 2 for the ACEC.

b) Short-term Uses vs. Long-term Productivity

In the short-term, the vigor of stands thinned to 60% canopy closure would be increased. The long-term productivity would be expected to increase due to increased stand vigor. Retention of remnant mature overstory trees in mid to late seral stands would be equivalent to the No Action Alternative but long-term retention of larger diameter early seral pines and hardwoods would be less than with other action alternatives. This is primarily due to thinning strictly being from below for ladder fuel and crown closure reduction. Thinning in this manner would not provide for release of preferred species from adjacent less desirable dominant and co-dominant tree species. Overall changes in stand density, canopy closure and risks to disturbance are shorter term when compared to other action alternatives due to higher densities being retained and fewer overall acres being treated.

c) Irreversible or Irretrievable Commitments of Resources

None anticipated.

d) Cumulative Effects

Treatment under this alternative would result in stands which have improved vigor and lower risks to crown fire potential. Overall, treatments under this alternative work towards maintaining existing conditions on the landscape with reduced risks for catastrophic disturbance. Stand susceptibility to insect attack, disease infection and fire would be expected to be reduced. In true conifer stands, approximately 980 acres treated would enhance stand vigor and promote late seral development. Nine hundred acres would be treated to maintain existing seral conditions while reducing potential loss from wildfire.

5.2 Fuels Hazard Reduction

a) Direct & Indirect Effects

Under this alternative approximately 4,800 acres of treatment would occur across a variety of vegetation types using various methods (see Vegetation section). These treatments would have the same effects as that described in Alternative 2. For this alternative, treatments are limited to strategy areas intended to prevent large fire spread. As a result stands identified for treatment

outside of these areas would remain unchanged and the associated fire risks would be as described in Alternative 1.

b) Short Term Uses vs Long-Term Productivity

Like Alternative 2, in the short term fire hazard would be reduced. To maintain this reduction, fuels treatment would need to be maintained. The potential for large scale fires over the project area would be lessened, resulting in a reduced risk of long term productivity losses to resource values which are at risk to catastrophic events. As described in the Vegetation section, stocking reduction in treated conifer stands would generally be to a lesser degree than in the other action alternatives. As a result reduction of crown fire potential and fire intensities would be shorter term. Diameter growth to develop larger fire resistant trees would be slower and canopy closure as well as self thinning would occur in a shorter period of time.

Within stands outside of strategy areas however, the risk of stand replacing fire at the stand level would remain high. The potential for high intensity fire would increase in these areas, until some action occurs to change existing stand dynamics. When a stand replacing fire event does occur, it may have a high potential for impacts to long term site productivity for related resources such as adjacent riparian areas, soils and forest structure. These effects are as described in Alternative 1, but occur at a more localized level in this alternative.

c) Irreversible or Irretrievable commitment of resources

None anticipated

d) Cumulative Effects

Cumulatively, treatments would result in a shift in fuel models and expected fire intensities throughout the watershed as described for Alternative 2 & 3, (See BLM Intensity Ranking). Compared to Alternatives 2 & 3, there is a slight increase in area (approximately 360 and 380 acres respectively) which remains classified as having high expected fire intensities. This is reflective of treatments outside of strategy areas being deferred. Within strategy areas, cumulative changes in fuel continuity to reduce the potential of large fire spread is similar to that described for Alternatives 2 and 3.

5.4. Wildlife

a) Direct and Indirect Effects

Threatened and Endangered Species

This alternative would likely adversely affect Northern spotted owl. Alternative 5 would be least impacting of the three proposed action alternatives. Approximately 900 acres of suitable spotted owl habitat are proposed for entry. 117 acres would be downgraded from nesting habitat to roosting/foraging habitat, and 414 acres of suitable habitat would be downgraded to dispersal habitat. No regeneration harvest is proposed. Alterative 5 would protect more of the available spotted owl habitat than Alternatives 2 and 3. Timber harvest would only occur in areas where density management was prescribed to reduce the fire hazard in the watershed.

No actions are proposed in the section where the spotted owl pair were located in section 25. There would be no disturbance to the owls or to the eagles above current levels.

A ¼ mile seasonal restriction would be in place to reduce noise and activity disturbance for the spotted owls nests if they are active.

No action would occur within ½ mile of the eagle nest.

Other Wildlife
Hardwood conversion would not occur in sections 11 and 13.

Some great gray owl habitat would be entered in the areas where the hazardous fuel buffers would occur on the ridges. There would be less loss of great gray owl habitat under Alternative 5 than would occur under the other action alternatives. In the Butte Falls Resource Area, great gray owl nests have been found in open areas with little overstory vegetation, but they all occur in forests which are open beneath the forest canopy for free flight. Understory thinning of small trees within the 300 foot meadow buffer would occur only in areas where dense understory trees would provide ladder fuels into the overstory. Cutting the smaller pre-commercial size trees would improve the area for flight and reduce the encroachment of conifers into the meadows, and would be expected to improve growth in the larger overstory trees due to less competition from the understory trees.

Cover and nesting substrate for some birds would also be removed through this proposed action. No planned or intentional take would occur. Buffers for the survey and manage species (fungi, lichens, and plants) would preserve small patches of habitat which could be used for hiding cover and nesting birds. The proposed action, while affecting local individuals and causing the loss of habitat, and possibly disrupting the nesting cycle in the year the action occurred, would not have significant effects to the populations of land birds. Because less timber harvest would occur under Alternative 5, more habitat would be retained.

Effects of prescribed fire would be the same as Alternative 2.

b) Short-term Uses vs. Long-term Productivity
Less harvest is proposed in Alternative 5 and more habitat would be available in the short term. Long term productivity would be expected to improve in some of the stands where thinning would occur to reduce competition for light, moisture and nutrients.

As in Alternative 2 and 3, there would be an expected reduction of forage in the short term due to fire disturbance before grasses and shrubs put out new growth. However, this is would improve within one year, when nutritious growth would be expected. Cover would be reduced in the wedgeleaf areas as a result of the crushing action. Future plans are to maintain the use of fire in the watershed on a rotational basis. This would lead to an overall reduction in the chapparal/brush habitat which some birds use for nesting and foraging. This would return the watershed to a more "historic" condition with more open grasslands with less overall dense wedgeleaf stands.

Cover and nesting substrate for some birds would be removed through this proposed action. However, under this proposal, no shelterwood, select cut, regeneration harvest, or hardwood conversion are proposed. Fire would be occurring during the wet spring months, and a mosaic pattern would occur on the landscape. Other buffers for the survey and manage species, mollusks, fungi, lichens, and plants would help preserve small patches of habitat which could be used for hiding cover and nesting birds.

Prescribed fire effects would be the same as Alternative 2.

c) Irreversible or Irretrievable Commitment of Resources

None identified.

d) Cumulative Effects

No acres are proposed for regeneration harvest in the connectivity block. Loss of understory habitat would occur as a result of the thinning and understory removal. This alternative would leave most overstory intact, and the cumulative effects would be least of the proposed action alternatives. Some spotted owl habitat would be degraded from nesting to roosting, foraging, but would be expected to return to nesting habitat within 10 to 20 years, or sooner. This alternative would preserve more late successional habitat for wildlife, which depend more upon the late successional habitat than the other action alternatives. Private industry has removed much of the large older forests on their lands within the watershed. Most of the private timber land in the watershed would be expected to remain in early to mid-seral condition.

5.5. Hydrology/Water Quality

a) Direct and Indirect Effects

The direct and indirect effects of Alternative 5 are expected to be the same as described in Alternative 2 of this EA. However, there would be no temporary roads built and a very short (0.07 mi) permanent road built in this alternative. This would greatly reduce the chance for new road construction related sediment to reach stream channels.

b) Short-term Uses vs. Long-term Productivity

Under Alternative 5, there would be no changes in the long-term productivity on the hydrology of the area.

c) Irreversible or Irretrievable Commitment of Resources

None anticipated

d) Cumulative Effects

This alternative would have negligible added cumulative effects at both the 6th field subwatershed and 5th field watershed scale. There is no net increase in roads, no new openings in the TSZ, no increases of early seral stage vegetation, minimal additions of compaction, and no additional exposure to stream surfaces.

Fuels Treatment Projects - Hydrology Effects for all Action Alternatives

a) Direct and Indirect Effects

The effects of fire on the hydrology and water quality of forested watersheds are varied in time and space(Beschta, 1999). The potential increase of erosion and subsequent sedimentation from prescribed fire increases with fire severity, soil erodibility, steepness of slope, and intensity or amount of precipitation. The magnitude of erosion and sedimentation from prescribed fire is usually minor because the times and locations that these occur together are rare (McNabb et al, 1999). Forests generally have very low erosion rates unless they are disturbed. Common disturbances include prescribed and wild fire, and harvesting operations. The impact of these

operations, however, last only for a short time, perhaps one or two years. After that, the rapid regrowth of vegetation soon covers the surface with plant litter, and potential erosion is quickly reduced (Elliot, 2000).

The direct effects on the hydrology and water quality of LBB from the fuel treatment projects are expected to be short term and minimal. The removal of vegetation, intensity of the burn, and exposure of mineral soil for fire lines and through slashbuster use are possible sources of sediment to stream channels. Over half of the fuels treatments are designed to be hand treatments which would limit the amount of ground disturbance. The PDF's for this project would minimize the potential for sedimentation in the local stream channels (See PDF's). By designing low intensity burns and spacing out the treatments over time, it is expected that sedimentation from erosion would be minimal. Partial removal of vegetation is expected to increase the amount of water availability. However, the remaining vegetation is expected to utilize any additional soil moisture. Therefore the overall timing and amount of water available is not expected to change.

The indirect effects are expected to reduce the potential sedimentation that would occur from a high intensity wildfire.

b) Short-term Uses vs. Long-term Productivity

By implementing the fuels treatment projects, there would be no change in long-term productivity for the hydrology of the area.

c) Irreversible or Irretrievable Commitments of Resources

None anticipated

d) Cumulative Effects

This project could have the effects listed above at the site scale. Added cumulative effects at the 6th field subwatershed and the 5th field watershed from this project are negligible. This project would not increase the amount of openings in the transient snow zone, there would be no net increase in road density. Additional compaction would be minimized and mitigated by using PDF's and implementing restoration projects.

5.6 Aquatic Habitat

a) Direct and Indirect Effects

Same as the effects of Alternative 2.

b) Short -term Uses vs. Long-term Productivity

Same as the effects of Alternative 2.

c) Irreversible or Irretrievable Commitments of Resources

None anticipated.

d) Cumulative Effects

Same as the effects of Alternative 2.

e) Determination of Effects on Southern Oregon/Northern California (SONC) Coho Salmon and SONC Critical Habitat from Implementation of the Proposed Alternative.

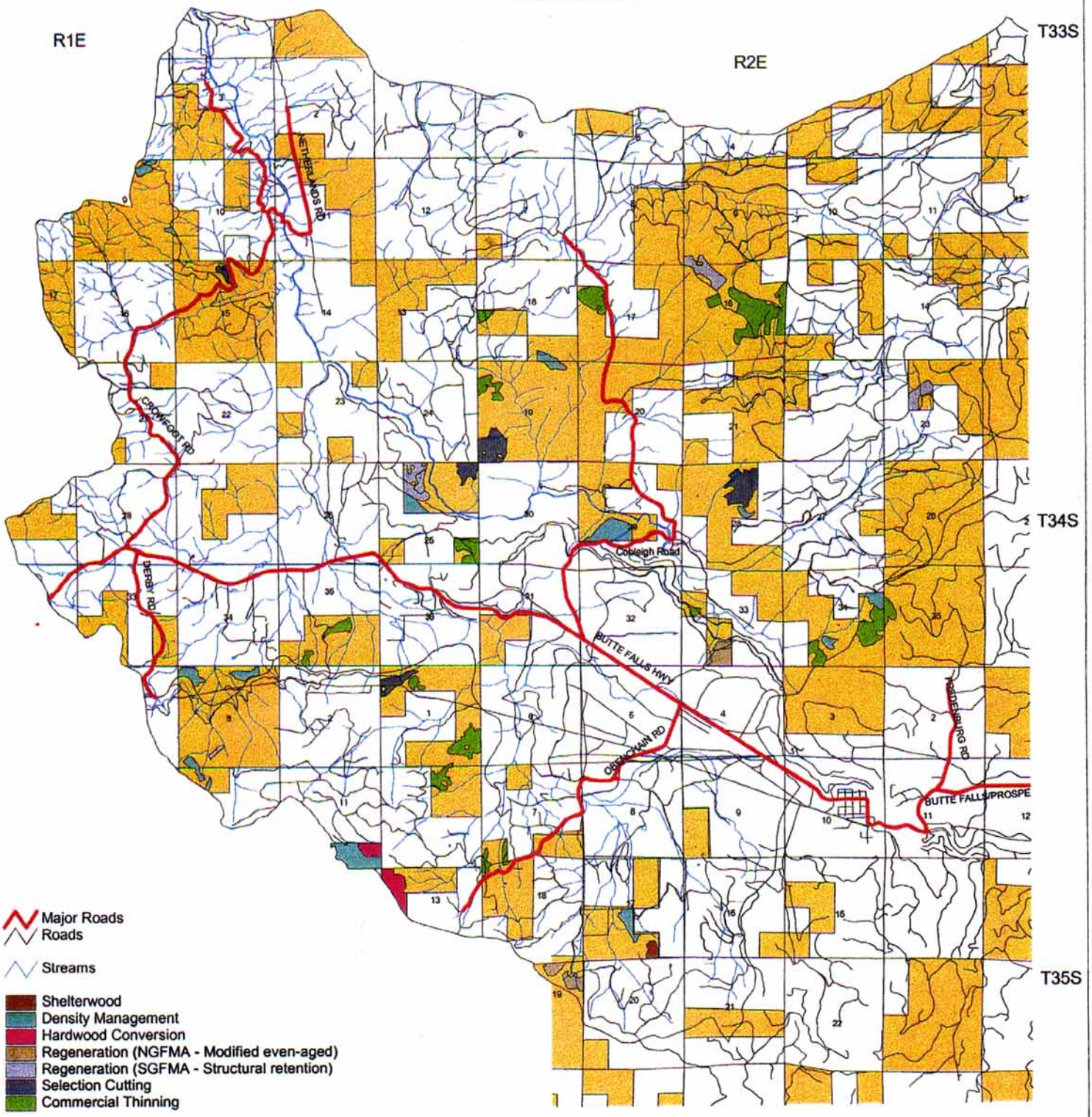
May Affect, Not Likely to Adversely Affect

The effects of this alternative would be identical to those already identified in Alternative 2. Informal consultation with the National Marine Fisheries Service (NMFS) was initiated in June 2001 for SONC coho salmon and SONC Critical Habitat.

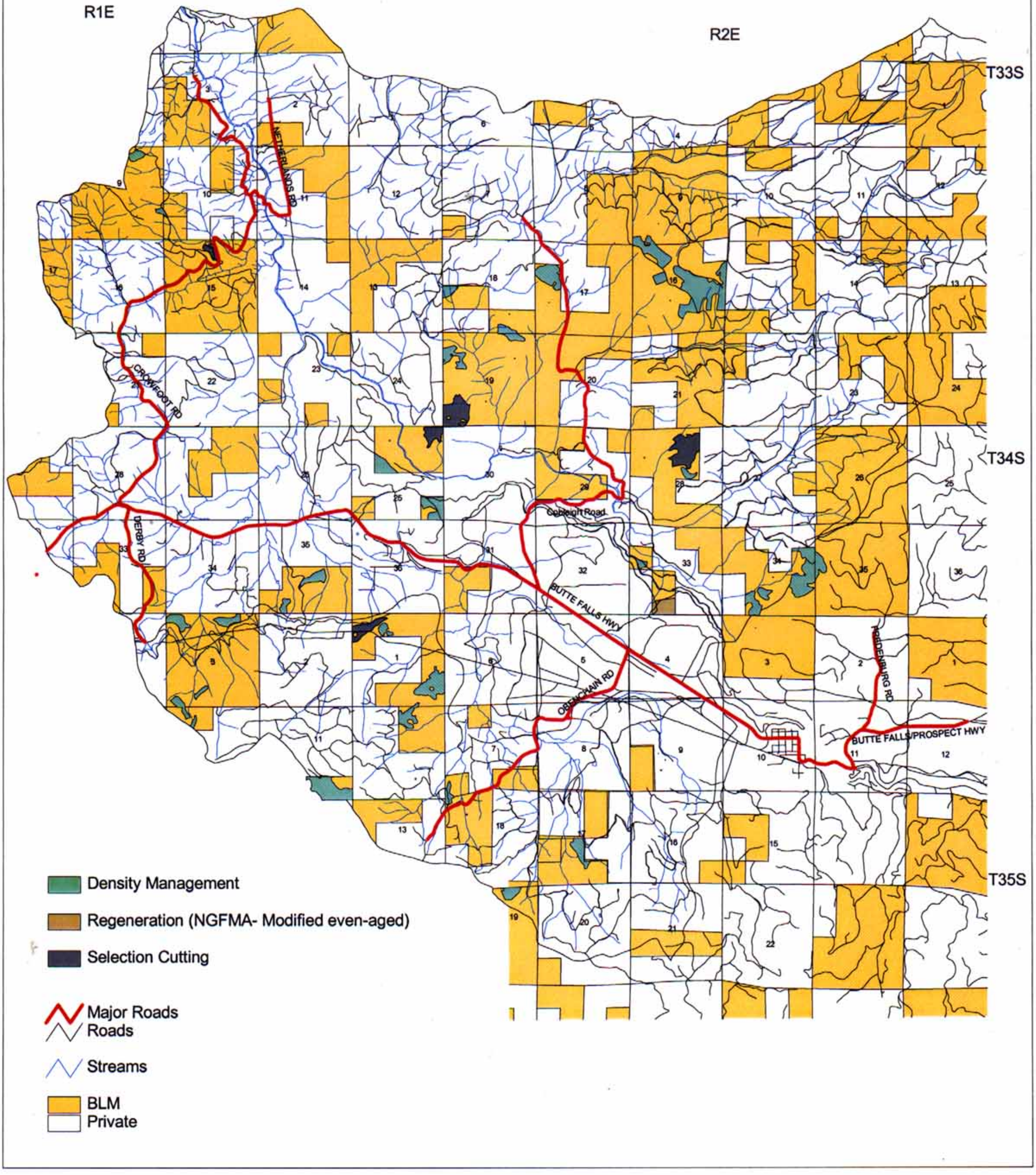
V. List of Preparers

NAME	RESPONSIBILITIES
Mike Korn, Forester	Silvicultural Prescription Writer, Layout
Linda Hale, Wildlife Biologist	T&E Animals
Jayne LeFors, Fisheries Biologist	Fisheries/ Aquatic Ecosystems
John Dinwiddie, Fuels Specialist	Fuels/Air Quality
Ken Van Etten	Soils
Doug Kendig, Riparian Reserve Coordinator	Riparian/Special Status and Survey & Manage Plants
Shawn Simpson, Hydrologist	Water, Wetlands, & Flood plains
Amy Sobiech, Forestry Technician	Cultural Resources
Randy Byran, Engineer	Engineering, Roads
John Bergin, Ecosystem Planner	Planning
Jean Williams, Environmental Coordinator	Environmental Coordinator

Lower Big Butte Proposed Timber Harvest
Alternative 2

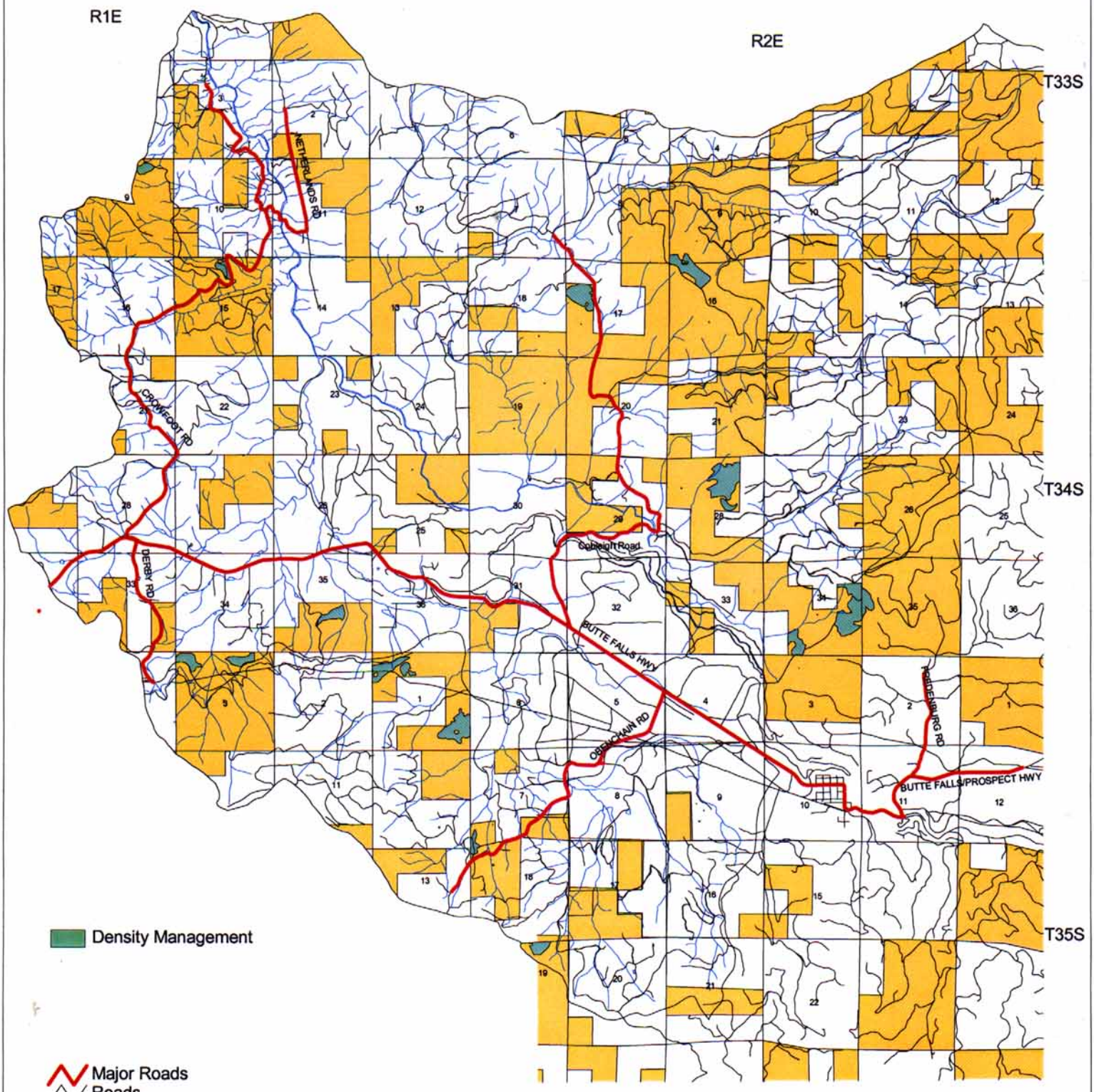


Lower Big Butte Proposed Timber Harvest
Alternative 3

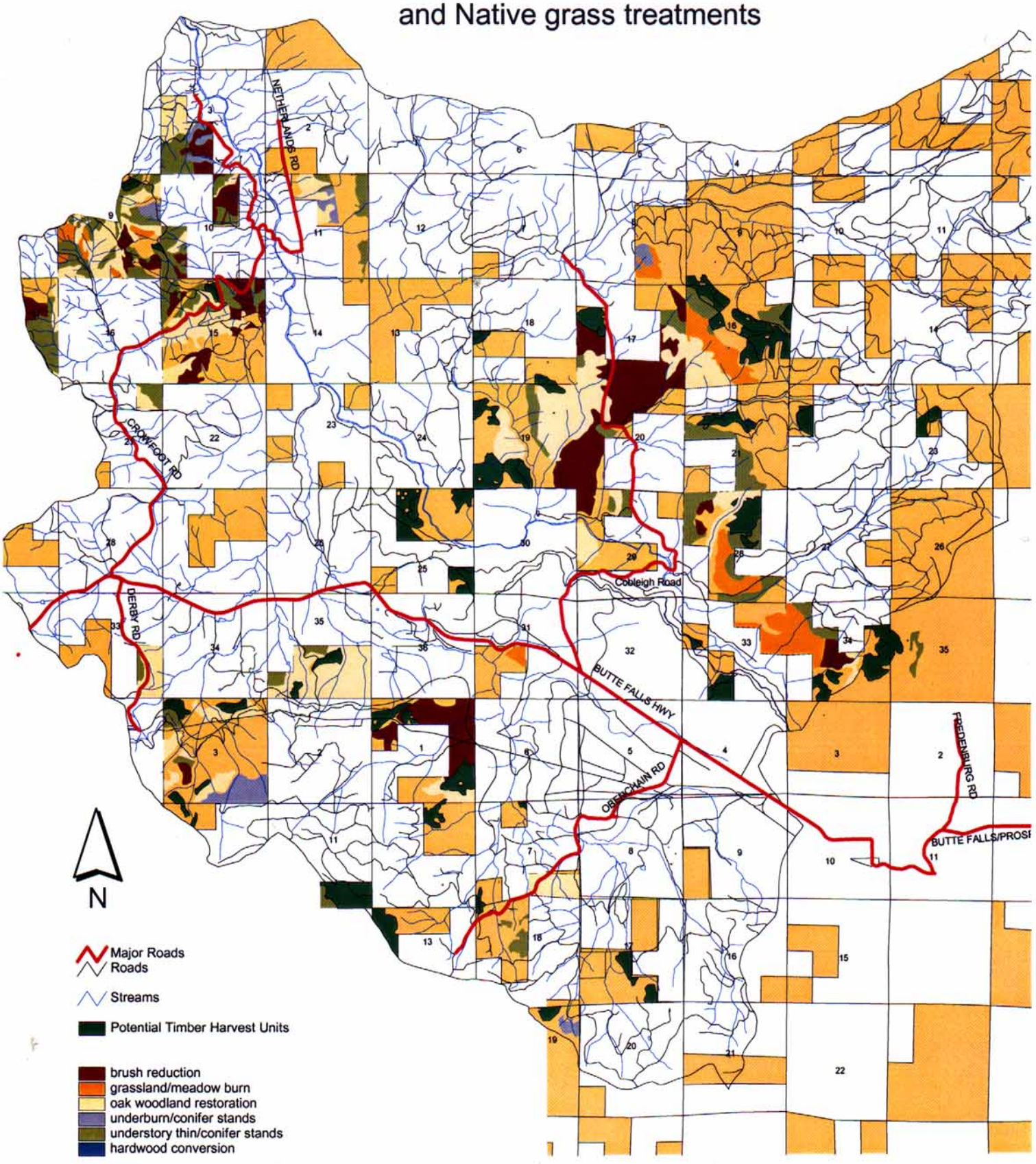


ALT31

Lower Big Butte Proposed Timber Harvest
Alternative 5

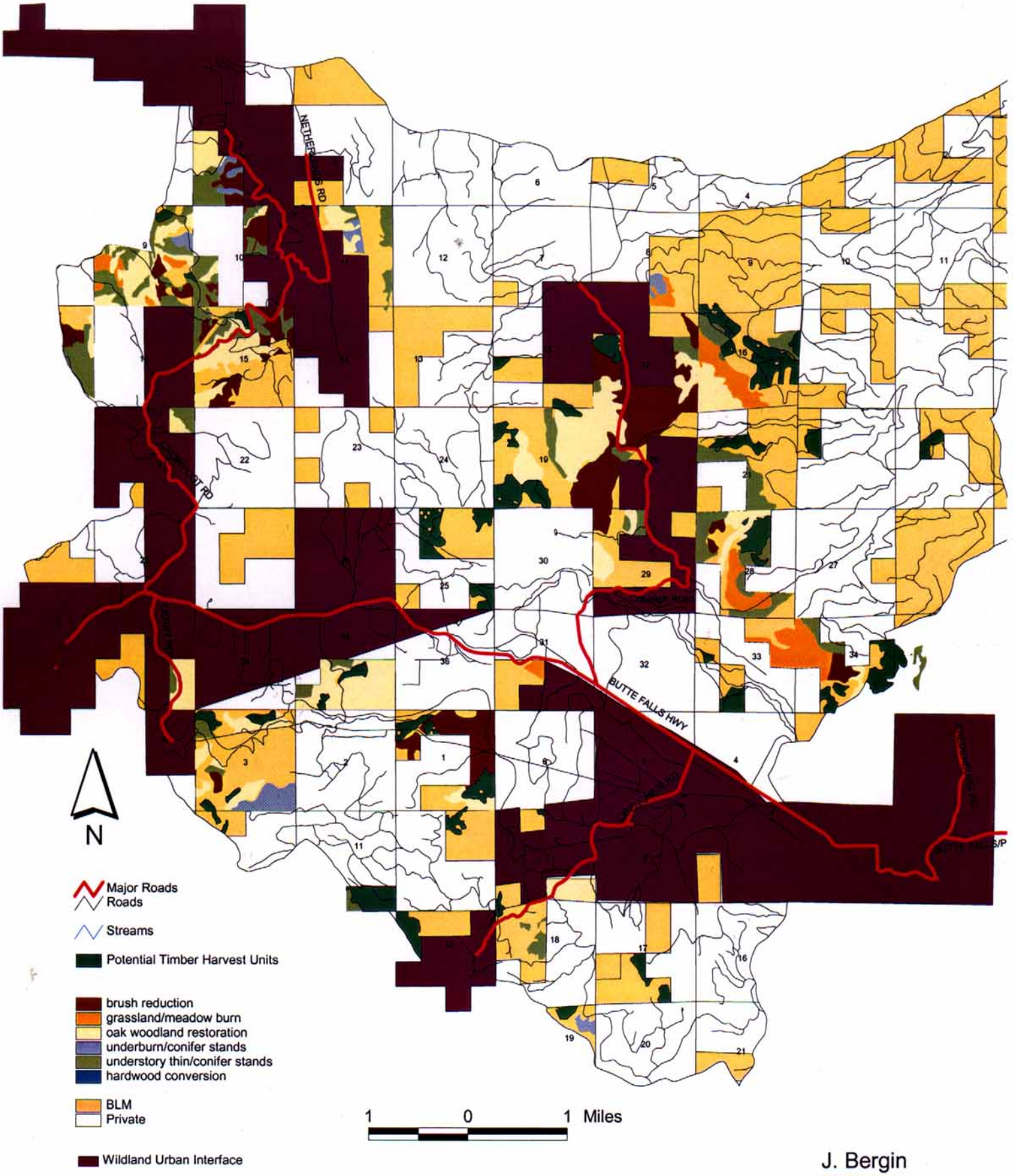


Lower Big Butte - Alternative 2, 3, & 5
Fuels Hazard Reduction, Oak Woodlands and Native grass treatments



J. Bergin
2-28-02

Lower Big Butte -
Wildland Urban Interface w/Proposed Treatment Units



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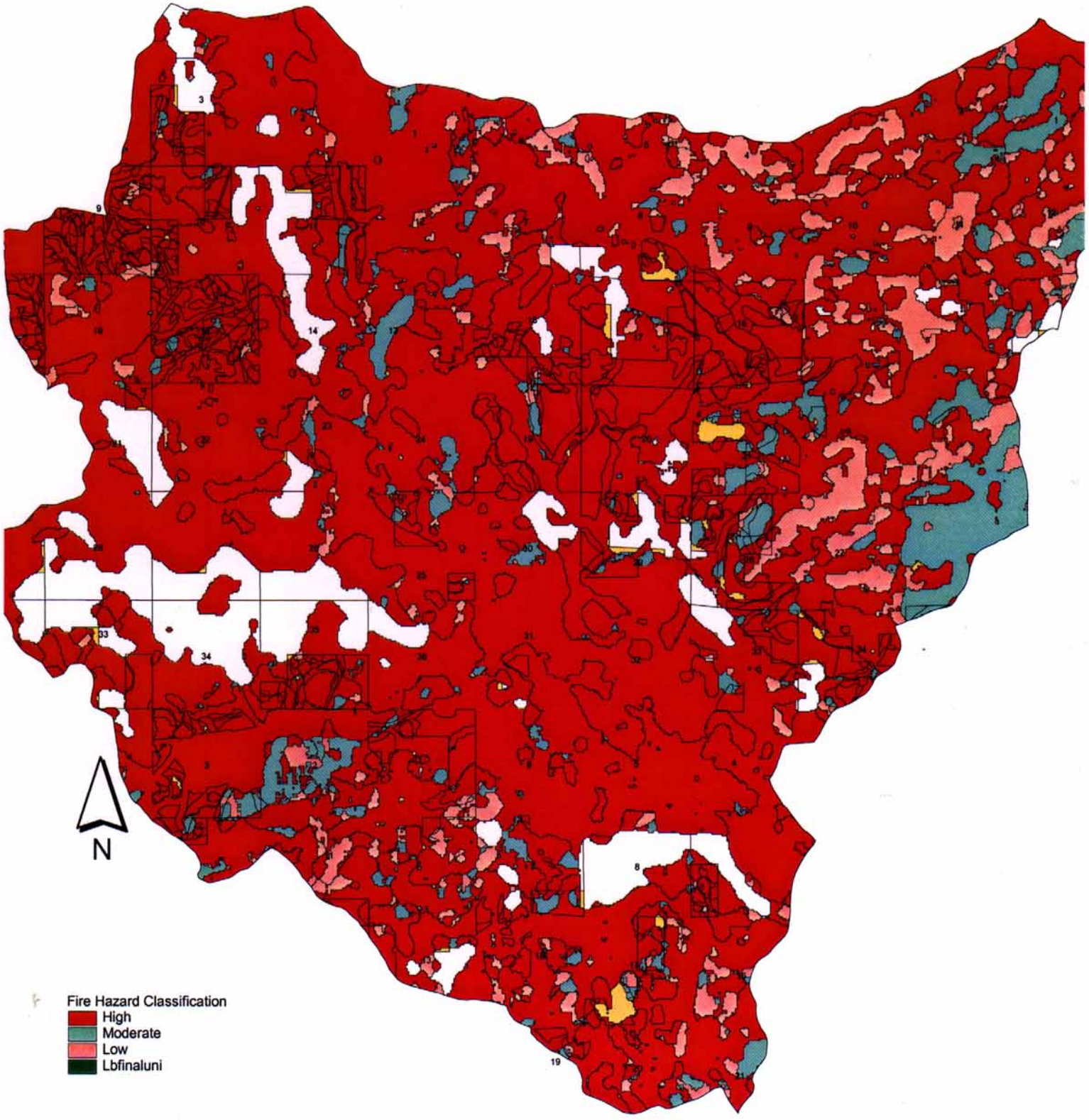
2-28-02

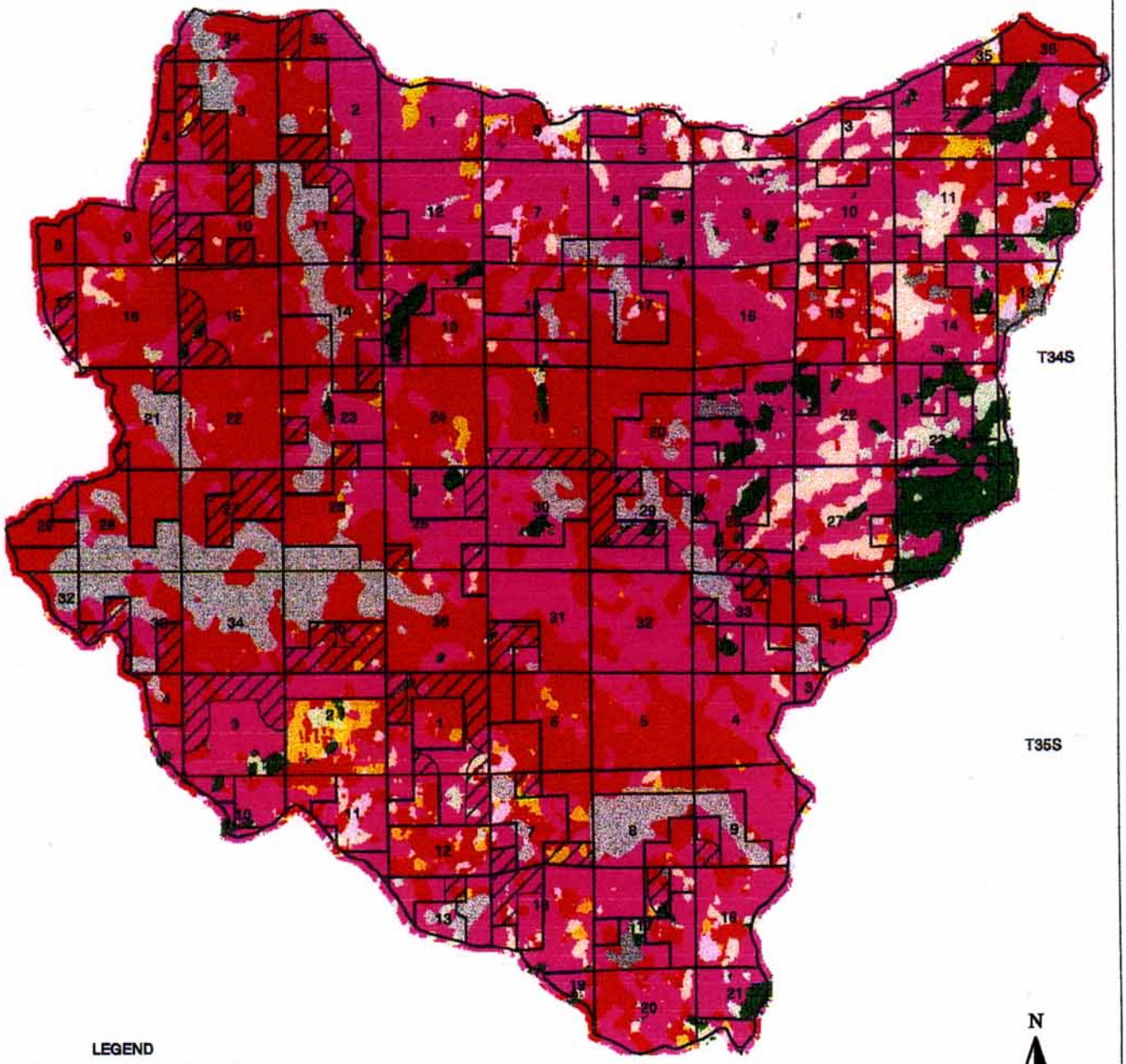
Lower Big Butte
Fire Hazard Classification



J. Bergin
2-28-02

MAP 18

LOWER BIG BUTTE FUEL MODELS



LEGEND

RURAL INTERFACE AREA

FIRE BEHAVIOR FUEL MODELS

1 GRASS 1,510 AC
2 GRASS / SMALL SHRUB 435 AC
4 TALL SHRUB 16,631 AC
5 SMALL SHRUB UNDERSTORY 416 AC
6 MOD.SHRUB 18,858 AC
8 LIGHT TIMBER LITTER 489 AC
10 TIMBER - MOD. GROUND FUEL 1,627 AC
88 URBAN/AG 3,641 AC
99 BARREN 207 AC

1 0 1 2 Miles

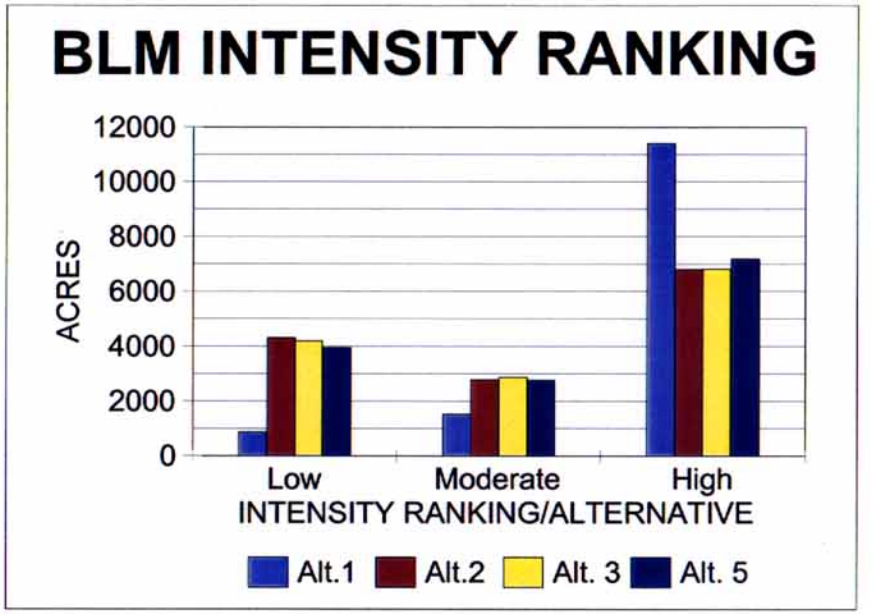
SCALE 1:100000

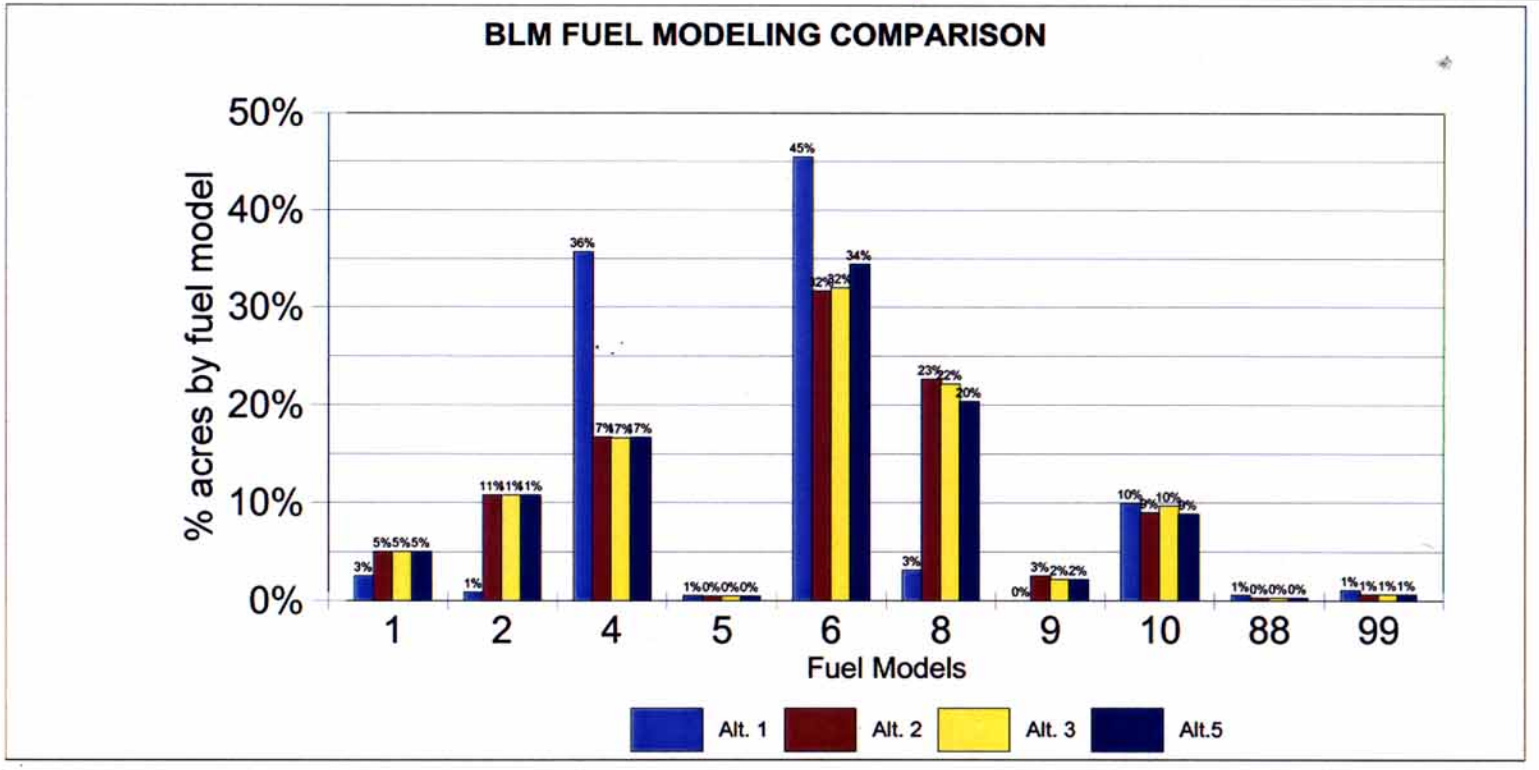
N

P. RITTER 5/5/99

SOURCE - LANDSAT THEMATIC MAPPER, WESTERN OREGON
DIGITAL IMAGE PROJECT - 8X8 FOCALMAJORITY

Fuel Models	Alt. 1	Alt. 2	Alt. 3	Alt.5
1	2.6%	5.0%	5.0%	5.0%
2	0.9%	10.8%	10.8%	10.8%
4	35.7%	16.8%	16.6%	16.7%
5	0.5%	0.5%	0.5%	0.5%
6	45.5%	31.7%	32.0%	34.5%
8	3.1%	22.7%	22.2%	20.4%
9	0.0%	2.6%	2.2%	2.2%
10	10.0%	9.0%	9.7%	8.9%
88	0.6%	0.3%	0.3%	0.3%
99	1.1%	0.6%	0.6%	0.6%





Appendix A

Project Tracking Form for Non-Exempt Undertakings
under the
Oregon BLM/SHPO Cultural Resource Protocol

Project Name: LOWER Big Butte Cultural Survey Project Acres: 1375
Cultural Project Number: BF99-76
Project Number (EIS, EA, CE or Conformance Determination):
ID Team Leader:
Location (Township, Range and Section): T 34, 35 / R 1, 2 E
USGS Quad: BUTTE FALLS, OBENCHAIN

____Reduced or Exempted Inventory
- ____Protocol Appendix A (Survey Techniques for Densely Vegetated Areas)
- ____Protocol Appendix B (Livestock Use Allocations)
- ____Protocol Appendix C (Prescribed Burn Project Areas)
- ____Protocol Appendix D (Cultural Resource Inventories in the Coast Range Province)
- ____Protocol Appendix E (Exempt Undertakings)
- ____Other Justification:

____Small Project (< 10 acres or <2 linear miles), No Resources
X Large Project (> 10 acres or >2 linear miles), No Resources
X No Effect Determination
- BLM Site Numbers: 35 AR 11-905, 663, 664, 909, 667, 667, 665, 906, 902, 647, 903, 904, 909, 636
- BLM Isolate Numbers:

____No Adverse Effect (Effects Mitigated Through Treatment)
- BLM Site Numbers:

____SHPO Review Required
- ____Mitigation Plan forwarded to SHPO for 30 day review.
  - ____Indicate Date SHPO Received:
  - ____SHPO concurrence; Date:

The BLM has completed its Section 106 responsibilities under the 1997 National Programmatic Agreement and the 1998 Oregon Protocol.

Signature _____ Date 12-14-01
Professional Cultural Resource Specialist

Signature _____ Date 12/17/01
Field Manager

****

X Pre-Project field review of sites needed (check flagging, etc.)
- Site Numbers: 35 AR 11-905, 663, 664, 909, 667, 665, 906, 902, 647, 903, 904, 909, 636
- Dates accomplished: 5/2001

X Post-Project field review needed
- Sites protected 35 AR 11-636, 35 AR 11-904, 35 AR 11-905, 35 AR 11-907
- Dates accomplished: 6/2001

APPENDIX B

TO: Jean Williams
FROM: Douglas Kendig, Botany and Riparian Specialist
Date: March 7, 2002
SUBJECT: **Botany Lower Big Butte EA. (update)**

BUREAU SPECIAL STATUS (BSS) AND SURVEY AND MANAGE (S&M) VASCULAR AND NON-VASCULAR PLANTS AND FUNGI

SPECIAL STATUS VASCULAR PLANT FOR LOWER BIG BUTTE E.A

Rare Species Overview

Southwest Oregon is one of the most botanically diverse areas in the United States due to the merging of two mountain ranges. The Klamath Mountains are one of the oldest formations in Oregon while the southern Cascade Range is the most recent. The physiographic components of the area such as varied geology, topographic relief and aspects, broad climatic and precipitation ranges shape a wide diversity of plant communities. Historic plant migrations north and south influence the bio-diversity in the region and contribute greatly to the high number of rare species in the region. The Big Butte watershed is located in the foothills and lower to mid slopes of the Cascade Range where conifer forest communities merge with mixed hardwood, chaparral and oak/grassland communities.

Locations of special status plant and fungi species are discovered during surveys for projects, mainly timber sales, and more recently forest plantation maintenance, fuels treatments, and restoration work. Currently, thirty-three Special Status Vascular Plant Species are known in the Butte Falls R.A. on over 344 sites. Lower Big Butte Creek watershed has numerous rare plant species.

PROJECT SUMMARY

Bureau Special Status Vascular Plants
(Bureau Special Status and Survey and Manage Species)
Survey Summary

Special Status vascular plant surveys were conducted on approximately 4544 acres within the project area. Approximately 2207 acres in 2001, 472 acres in 2000, and 1865 acres in 1999 were surveyed Surveys were conducted on all units in the project area by field botanists using intuitively controlled transect survey methodology with emphasis on special habitats such as riparian areas, meadows, rock outcrops, as well as mature forest habitat. The Medford District Special Status Plant List for 1999/2000/2001 provides a list of Federally listed, State listed, Bureau Sensitive and S&M species likely to occur on the district. A list of target species likely to occur in the project area was created for field use during surveys. While completing the surveys, a comprehensive list of all vascular plants was created by unit. Eleven Special Status Vascular Plant species were discovered on 226 sites (see table 1 below).

Special Status Vascular Species Discovered

Table 1 SPECIAL STATUS VASCULAR PLANTS

Species	Special Status Category	Number of Sites	General Description of Population	Mitigation - Protection Strategy
Allium boanderi var mirable	BTO	1		1. Population buffered with 100 foot buffer
Carex interior	BAO	5	Wetland sedge occuring in riparian areas and irrigation canals	1. Protected within Riparian Reserve.
Carex livida	BAO	8	Wetland sedge occuring in riparian areas and irrigation canals	1. Protected within Riparian Reserve.
Carex serratodes	BAO	3	Wetland sedge occuring in riparian areas and irrigation canals	1. Protected within Riparian Reserve.
Cypripedium fasciculatum	BSO S&M - C	6	Single populations.	1. Discovered outside unit. 2. Protected within Riparian Reserve. 3. Unit or portions of units dropped. 4. Population buffered with 100-150 feet buffers
Fritillaria gentneri	FE	3	Small populations in mixed hardwood conifer community	1. Population buffered with 100 foot buffer
Lewisia cotyledon var. howellii	BTO	1	Occurs on rock faces	None
Limnanthes floccosa ssp bellingeriana	BSO	5	Single populations	1. Population buffered with 100 foot buffer
Navarettia tagetina	BTO	1	Annual	None
Plagiobothrys glyptocarpus	BAO	14	Annual, congregations along intermittent ot perennial streams.	1. Protected within Riparian Reserve
Scribnaria bolanderi	BTO	179	Annual grass species associated with seasonally wet rock substrates.	None

Protection Measures

Each Special Status vascular plant species and site will be evaluated to determine the appropriate level of protection to ensure viability of the species, the population and habitat. Some species and sites may not be effected, or may even benefit in the long-term from pro-active management activities during periods of dormancy or senescence, such as fall burning, that enhance habitat or reduce competition. Other situations may require protection buffers in the range of 100 ft radius or more, although the exact buffer size will be determined by considering a number of ecological and physiologic characteristics, including

aspect, slope, canopy closure, herbaceous ground cover, fuel loading, incident solar radiation, aut-ecology, and local population abundance, distribution and density where appropriate. Protection measures may vary from site to site. Informal risk assessments will be conducted on a site by site basis based on the prescribed activity and site conditions to determine the potential risks and impacts to the population, any potential micro-site habitat changes, and any inter-related host dependancies effects.

Protection measures will be implemented with the intention of managing known sites to conserve rare species and populations and to ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as T/E in accordance with the Management Recommendations for Vascular Plants, Dec. 1998 and BLM Manual, 6840 Special Status Species Management Sept. 1988.

Under the preferred alternative all timber harvest units would maintain a canopy of 40% or more except for one clear-cut unit. Protection buffers of 100 feet are in density management and thinning units are expected to provide adequate protection from direct and indirect effects of the proposed actions. One Cypripedium fasciculatum site was discovered 150 feet outside of the clear-cut unit. The site occurs on a north facing rock bluff with other suitable habitat surrounding the site on 3 sides. It is expected that 150 feet buffer would provide adequate protection from direct and indirect effects of the proposed actions.

Protection buffers are one of two protection measures employed to protect S&M and Special Status species populations on sites in or near harvest units, the other being dropping units or portions of units. Protection measures are based on S&M Management Recommendations developed by taxa experts and adopted by the BLM & USFS. Numerous reference sources and professional experience are considered in developing appropriate protection measures.

The protection measures applied in this EA are expected to protect all known S&M and Special Status species populations from any direct effects. Indirect effects are more difficult to quantify but the protection measures applied to known sites in this EA are expected to provide effective protection for long term population viability.

Fritillaria gentneri

One Federally listed Endangered plant species, *Fritillaria gentneri,* occurs within the proposed project area in the Butte Falls RA. There are approximately 90 known populations on the Medford District. Typical habitat characteristically occurs on low elevation hillocks and foothills just above the valley floor in a variety of chaparrel, hardwood and mixed hardwood/conifer vegetation communities. Dense conifer stands are not suitable habitat for this species and none was found during the course of vascular plant surveys.

Four known site occurs within the general project area, one along Cobleigh Road on private land and 2 on BLM lands. Populations occuring on BLM lands would be protected by 100 feet protection buffers. It is not expected the activities described under this E.A. would effect this population or its habitat.

Determination of "Effects"
Vascular plant surveys that include searches for Fritillaria gentneri have been completed for all Timber Sale units and related harvesting activities, slash and landscape fuel treatments, road improvements, and restoration projects.

The BLM finds that the proposed timber sale and related actions would have **no affect** on *Fritillaria gentneri* or potential habitat provided the project is carried out with the designed conservation measures.

The landscape fuels treatment project occurs in suitable habitat associated with chaparral and mixed hardwood/conifer vegetative communities. All vascular plant surveys on all units have been completed. No sites were discovered during surveys for these projects, however 2 sites were discovered in 2001 within the treatment area during general *Fritillaria gentneri* habitat surveys. The landscape fuel treatment project would have **no affect** on *Fritillaria gentneri* or potential habitat provided the project is carried out with the designed conservation measures.

Description of *Fritillaria gentneri* Habitat
Fritillaria gentneri, listed as "Endangered" with the FWS, occurs in the project area. A critical habitat determination has not been made. The Final Rule for *Fritillaria gentneri*, January 10, 2000, describes three suitable habitats,

1) oak woodlands dominated by *Quercus garryana*,
2) mixed hardwood forest dominated by *Quercus kelloggii*, *Quercus garryana*, and *Arbutus menziesii*,
3) coniferous forests dominated by *Arbutus menziesii* and *Pseudotsuga menziesii*.

Fritillaria gentneri is found only in Jackson and Josephine Counties with most populations within a seven mile radius of the Jacksonville Cemetery. Population size is near the threshold necessary for long-term genetic integrity. However, Guerrant believes that *Fritillaria gentneri* may be sterile and that the plant is largely reproducing asexually.

Surveying for presence and monitoring the numbers of this species produces variable and unreliable results. An accurate count of the number of individuals is difficult to obtain because many plants remain dormant for several years and flowering plants may be grazed before setting flowers and therefore impossible to locate and census.

Factors affecting the species include:
A. The present or threatened destruction, modification, or curtailment of its habitat or range. Small populations scattered across the urban interface subject this species to losses from direct and indirect effects. Indirect effects, usually associated with development, alter the habitat which makes conditions unsuitable for the species. Obviously, direct damage to small populations can extirpate the species from parts of its range.
B. Overutilization for commercial, recreational, scientific, or educational purposes.

Recreational collection and collection for cultivation could adversely affect the species, especially along roads.
C. Disease or predation. Many individuals get browsed before producing mature fruit. Future generations and the soil seed bank become depleted.
D. The inadequacy of existing regulatory mechanisms. Before being listed as endangered by the FWS, the only protection came from two state laws effective only on state owned or leased lands.
E. Other natural or manmade factors affecting its continued existence. Years of fire suppression have led to changes in habitat structure and composition. This has produced a less-than-optimal habitat condition that is also susceptible to catastrophic fire. Small, isolated populations makes the species susceptible to decreased vigor and viability, extirpation from environmental events, and roadside maintenance.

The following table summarizes the results of surveys for Special Status vascular plants and the number of sites discovered and types of protection.

Bureau Special Status Non-vascular Plants
(Bureau Special Status and Survey and Manage Species)
Survey Summary
This summary of survey results for non-vascular plants and fungi includes Bureau Special Status and S&M species discovered, and site data collected, from surveys conducted under the Bureau 6840 Manual and Northwest Forest Plan EIS and ROD,1994, and the SEIS and Record of Decision for Amendment to the Survey & Manage, Protection Buffer, and Other Mitigation Measures Standards and Guidelines,2001.

Surveys were conducted for Survey and Manage (S&M) non-vascular plants and fungi species within the proposed project areas in Lower Big Butte watershed. Some surveys occurred prior to release of the Record of Decision for Amendment to the Survey & Manage, Protection Buffer, and Other Mitigation Measures Standards and Guidelines, 2001. The SEIS, among other changes, eliminated required pre-project surveys for all fungi except one, *Brigeoporus nobilissimus*. The known range of this species does not occur within the project area. All Bureau Special Status fungi are Tracking species and surveys are not required (BLM Manual 6840, 2001). Fall fungi surveys were completed on all timber stands prior to release of the SEIS. Fungi species that were placed in category A, B, C, D, and E and discovered within treatment areas were protected.

Non-vascular surveys on all units have not been completed (see Lower Big Butte Fuels Unit list below). Non-vascular plant surveys for the landscape fuel treatment project would be completed in the spring of 2002 and any sites protected with similar mitigation measures and project design features implemented before the project Record of Decision is signed.

Bureau Special Status and S&M bryophyte, lichen and fungi surveys were conducted on approximately 6443 acres between February 1999 and February of 2002. A total of 24 non-vascular plant and fungi species were discovered on over 186 sites.

Non-vascular plant surveys have not been completed for fuels treatment units in the following sections:

34-1-11
34-1-14
34-1-21
34-1-17
34-2-19
34-2-17
34-2-16
34-2-21

A pre-project review was undertaken to determine potential habitat for all target bryophyte and lichen species requiring pre-project surveys. All units were evaluated in-house from aerial photos and GIS maps, and later field verified on the ground to determine potential habitat for bryophyte and lichen species requiring surveys. Approximately 6443 acres were evaluated. Pre-project bryophyte and lichen surveys were determined to be necessary on all units.

Fungi Surveys
Fall fungi surveys were completed on all conifer dominated units totaling approximately 3159 acres while 3284 were determined not to have suitable habitat and not surveyed. Units not surveyed for fungi were meadows, chaparral communities, or mixed chaparral, hardwood, and conifer communities with conifers the minor component. No spring fungi surveys were conducted.

Spring Fungi Surveys Summary
Spring single visit fungi surveys, not to protocol standards, were completed on 1576 acres of the project area between March 20 and May 19, 1999. After protocols were published, approximately 1021 acres of spring fungi surveys were completed during the spring 2000 season. Complete fungi species list were recorded for all units.. A list of all S&M fungi species discovered during spring surveys and the number of sites is included in Table 5.

Lichen and Bryophyte Surveys Summary
Lichen and bryophyte surveys were conducted for Bureau special status species and S&M species between February 17, 1999 and February 7, 2001 on approximately 6443 acres.

Surveys were conducted by area botanists and by qualified contractors . Comprehensive species lists were created of all lichen and bryophytes discovered by unit. The project area was inventoried for lichen and bryophytes using intuitively controlled, random transect surveys. Surveys were conducted for all species, specifically targeting S&M species known to occur in the area and their known or suspected habitat.

Protection Measures
All fungi sites (S&M category A, B, C, D, and E) would be protected with a buffer of 100 ft

radius minimum or project design criteria, although the exact buffer width will be determined by considering a number of ecological and population variables, including aspect, slope, canopy closure, herbaceous ground cover, moss cover, incident solar radiation, local population abundance, and density where appropriate that will vary from site to site.

Lichen species, such as *Bryoria tortuosa and Dendriscocaulon intriculatum* populations occur on the boles of hardwoods. Most new populations have been discovered within proposed burn units or the edges of proposed timber harvest units. Risk assessments will be conducted on a site by site basis to determine the potential risks and impacts to the species and host based on the burn prescription and site conditions. Where these lichen species occur in timber harvest units, a 100 foot minimum protection buffer would be established. Where they occur in fuel treatment units, flame lengths would be minimized and host trees protected.

Protection measures will be implemented with the intention of maintaining existing site and microsite conditions in accordance with the Management Recommendations for Survey and Manage Fungi (Castellano & O'Dell 1997 V2.0, Management Recommendations for Vascular Plants, Dec. 1998, Management Recommendations for Survey and Manage Lichens, V2.0, and Draft Management Recommendations for Bryophytes, Installment 1).

Under the preferred alternative all timber harvest units would maintain a canopy of 40% or more except for one clear-cut unit. Protection buffers of 100 feet in density management and thinning units are expected to provide adequate protection from direct and indirect effects of the proposed actions.

Protection buffers are one of two protection measures employed to protect S&M and Special Status species populations on sites in or near harvest units, the other being dropping units or portions of units. Protection measures are based on S&M Management Recommendations developed by taxa experts and adopted by the BLM & USFS. Numerous reference sources and professional experience are considered in developing appropriate protection measures.

The protection measures applied in this EA are expected to protect all known S&M and Special Status species populations from any direct effects. Indirect effects are more difficult to quantify but the protection measures applied to known sites in this EA are expected to provide effective protection for long term population viability.

The following tables list all S&M and Non-Vascular plants and fungi discovered during field surveys by group, species, status, number of sites and an abstract of applied mitigation measures

Special Status Non-vascular Species Discovered

Table 2 **Special Status Species Summary Table**

Taxa Group	# of Species	# of Sites
FUNGI	15	130
BRYOPHYTES	3	21
LICHENS	6	35
VASCULAR	11	226
TOTALS	**35**	**412**

Table 3 **GROUP - LICHEN**

GENUS SPECIES	NEW S&M CATEGORY	NUMBER OF SITES	GENERAL DESCRIPTION OF POPULATION	MITIGATION - PROTECTION STRATEGY
Bryoria tortuosa	D	12	Generally, single or large open areas in Ponerosa Pine and oak woodland communities on foothills of Cascades	Limit flame lengths and intensity in populated areas or establish 100 foot buffers. 100 foot buffer around population in Timber Sales
Calicium viride	F	4	Occrs on boles of large trees or snags.	None
Dendriscocaulon intriculatum	B	13	On Black oak, at edge of mixed conifer, mature stand	Limit flame lengths and intensity in populated areas or establish 100 foot buffers. 100 foot buffer around population in Timber Sales
Dermaticarpon miniatum	None	3	Vagrant form found in open areas	None
Leptogium rivale	B	1	Aquatic lichen found in intermittent and perrenial streams.	Full riparian reserve buffers.
Ramalina thrausta	A	2		100 feet no treatment buffer

Table 4 **Bryophytes Species**

Genus Species	New S&M Survey Category	Number of Sites	General Description of Population	Mitigation - Protection Strategy
Funaria muhlenbergii	BAO	7	Terrestial	Populations buffered with 100 feet buffer
Meesia ulginosa	BAO	1	Wetland moss	Protected within Riparian Reserve
Othotricum euryphyllum	BTO	13		None

Table 5 **GROUP - FUNGI**

Genus Species	New S&M Survey Category	Number of Sites	General Description of Population	Mitigation - Management Strategy
Bondarzewia mesenterica	B	5	Found in or around large conifer trees or stumps (*PIPO* in BFRA) in late-successional coniferous forests	1. Discovered outside unit. or 2. Protected within Riparian Reserve. or 3. Unit or portions of units dropped. or 4. Populations buffered with 100 feet buffers
Clavariadelphus ligula	B	4		1. Discovered outside unit. or 2. Protected within Riparian Reserve. or 3. Unit or portions of units dropped. or 4. Populations buffered with 100 feet buffers
Clavariadelphus sachalinensis	B	28		1. Discovered outside unit. or 2. Protected within Riparian Reserve. or 3. Unit or portions of units dropped. or 4. Populations buffered with 100 feet buffers
Clavariadelphus truncatus	B	19		1. Discovered outside unit. or 2. Protected within Riparian Reserve. or 3. Unit or portions of units dropped. or 4. Populations buffered with 100 feet buffers

Collybia racemosa	B	1		
Helvella maculata	B	2	.	Population buffered with 100 feet buffers
Hydnum umbilicatum	B	3		Population buffered with 100 feet buffers
Pithya vulgaris	D	3		1. Discovered outside unit. or 2. Protected within Riparian Reserve. or 3. Unit or portions of units dropped. or 4. Populations buffered with 100 feet buffers
Plectania milleri	B	14		1. Discovered outside unit. or 2. Protected within Riparian Reserve. or 3. Unit or portions of units dropped. or 4. Populations buffered with 100-feet buffers
Ramaria rubripermanens	B	18		Population buffered with 100 feet buffers
Ramaria cyaneigranosa	B	2		Population buffered with 100 feet buffers
Ramaria sp		5		Population buffered with 100- feet buffers
Ramaria rianierensis	B	3		Population buffered with 100 feet buffers
Aleuria rhenana (Sowerbyella rhenana)	B	8		1. Discovered outside unit. or 2. Protected within Riparian Reserve. or 3. Unit or portions of units dropped. or 4. Populations buffered with 100 feet buffers Population buffered with 100 feet buffers
Trmiscus helveloides	B	25		Population buffered with 100 feet buffers

Table 6 Potential Special Status Vascular Plant Species

Species	Current Status
Cimicifuga elata	BSO
Cypripedium fasciculatum	BSO, SEIS- C
Cyprepedium montanum	BTO, SEIS- C
Fritillaria gentnerii	FE
Illiamna latibracteata	BAO
Limnanthes floccosa ssp.bellingeriana	BSO
Limnanthes floccosa ssp.pumila	STO
Limnanthes floccosa ssp.gracilis	BSO
Microseris laciniata ssp. Detlingii	BSO
Mimulus douglasii	BTO
Nemacladus capillaris	BAO
Perideridia howellii	BTO
Plagiobothrys glyptocarpus	BAO
Romanzoffia thompsonii	BSO
Scribnaria bolanderii	BTO

Status Codes:

FE Federal Endangered (USFW) - in danger of extinction throughout a significant portion of its range
FT Federal Threatened (USFW) - likely to become endangered species within the foreseeable future
SoC Species of Concern (formerly Federal Candidate 1, 2, 3) (USFW) - under consideration for listing, but additional information is needed to support a proposal to list under the Endangered Species Act

SE State Endangered - in danger of extinction in the state of Oregon
ST State Threatened - listed as likely to become endangered by the state of Oregon
SC State Candidate - listing is pending, or appropriate, if immediate conservation action not taken

BSO Bureau Sensitive Oregon - ONHP List 1; Oregon Candidate. Generally these species are restricted in range within Oregon and have natural or human caused threats to their survival.
BAO Bureau Assessment Oregon - ONHP List 2; Species where population trends are monitored and may require a minimum amount of protection or mitigation BLM activities.
BTO Bureau Tracking Oregon - ONHP List 3 and 4

SM Survey & Manage - Northwest Forest Plan ROD, 1994, Table C-3 directs management of known sites and/or survey for new sites

1 Oregon Natural Heritage Rank, critically imperiled throughout its range
2 Oregon Natural Heritage Rank, imperiled throughout its range
3 Oregon Natural Heritage Rank, not rare, threatened throughout its range
4 Oregon Natural Heritage Rank, not rare, apparently secure throughout its range

POVERTY FLAT ACEC

Background

Poverty Flats ACEC was established as an unusual natural ecosystem that developed over a shallow soil, basalt bedrock outcrop and that includes a unique intermittent stream wetlands ecosystem. Poverty Flats ACEC was designated in 1994 as a new ACEC in the Butte Falls RA. The ACEC is located along the Butte Falls highway approximately 3.5 miles from the town of Butte Falls in 34-2E-31. The area was proposed and later designated as an unusual natural ecosystem. A subspecies of Wooly Meadow-Foam (*Limnanthes floccosa ssp. bellingeriana*), a Special Status Plant Species (Bureau Sensitive Species) occurs in the vernal pool wetlands. A wide variety of native and non-native grass and forb species endemic to grasslands occupy the ACEC.

As a result of an agreement between Medco Corporation, The Nature Conservancy, and the BLM (signed June, 1993), a 4-strand barbed wire protection fence was constructed around the ACEC. Medco Corporation allowed the fence to be constructed on their lands, the BLM provided materials and administered the construction contract, and The Nature Conservancy agreed to maintain the fence yearly and provide the BLM with monitoring plans for the two protected species. It is not known whether this agreement was transferred along with the lands to Lone Rock Timber Company.

Existing Vegetative Community

A large seasonally wet area occurs within the ACEC where surface water accumulates and persists into the late spring. This unique seasonal habitat provides habitat for rare species, such as Wooly Meadow-Foam (*Limnanthes floccosa ssp. bellingeriana*), *Perideridia howellii*, *Scribneria bolanderi*, and other unusual seasonably aquatic species such as Monterey mariposa, common camas, Bach's downingia, and 2 species of monkey flower.

Where deeper soils occur, mounded areas, the vegetation composition changes quickly to a hardwood/brush species collection dominated by Oregon white oak, madrone, manzanita, and into Ponderosa Pine and Douglas-fir stands. A unique assemblage of shade tolerant grasses, annuals and perennials occur under the conifer/hardwood over-story with significant decreases in non-native grasses and forbs.

The early spring vegetative community is comprised mostly of native forb species and predominantly includes wild onion, yellow monkey flower, bicolored limnanthus, and rosy plectritis among others. Perennial grasses such as California oat grass, Idaho fescue, Lemmon's needle grass, and slender hair grass occur on the mounded, dryer areas and compete with non-native grasses. Later in the spring non-native species dominate many areas of the ACEC.

A significant component of nonnative weeds has invaded the meadow. In the mounded areas they include cheat grass, hedgehog dogtail, Klamath weed, Kentucky and bulbous bluegrass,

mullein, and rattail fescue. In the wetland areas the include moist site grasses such as velvet-grass (*Holcus lanatus*) and witchgrass (*Panicum capillare*). The relative abundance and density of these species is very high in the area closest to the highway and decreases beyond the intermittent stream and areas farther from the road. It appears the rock used for the road way and used to create parking areas and turn-outs have added considerably to the introduction and spread of non-native weeds within the ACEC. However, without monitoring it is unclear the influence of the non-native plants on the natural vegetation and the rate of spread within the ACEC. It may be much worse than anticipated.

Rock outcrops appear in areas throughout the meadow and host a completely different association of species which include: lace fern, sierra cliff brake fern, narrow-leafed stonecrop, gooseberry and many mosses.

The area has not been surveyed for non-vascular plant species. Likely habitat occurs in the ACEC for a variety of species. *Bryoria tortuosa*, is known to occur on white oaks in the ACEC and *Lobaria hallii* are known to occur in similar habitat with white oaks and Ponderosa pine occur.

Richard Callagan (Field Botanist)
1998 Survey Description of Poverty Flats
This virtually flat basalt rock out is the end of an old volcanic flow with cliffs along the southwest edge. Although this unique botanical area supports one of the few known populations of Bellinger's meadow-foam, it is covered with weeds including a small population of yellow star thistle in the interior and a larger one in the parking area. Although the star thistle is unlikely to threaten the meadow-foam populations it should be hand pulled while populations are still small. The greater threat is from moist site grasses such as velvet-grass (*Holcus lanatus*) and witchgrass (*Panicum capillare*) that occupy some of the same habitat. Bull thistle is lightly scattered in the area but is not a threat. One small population of *Scribneria bolanderi* was found on upper edge of a vernal pool. This plant is difficult to see and there could be more in the area. A secure population of Perideridia howellii was found along the outlet of the vernal pool area in flowing water. Another species of note was *Woodsia scopulina* found in rock crevices in the cliffs along the southwest edge. Cattle do graze through the area in spring causing some damage by trampling. This special area needs to be monitored on a regular basis for cattle damage and loss of habitat to weedy species.

Vascular Plant Summary
160 total vascular plant species inventory
41 Species of weeds (25% weed species in ACEC)
2 species on noxious weed list

List of Weed Species in Poverty Flats ACEC

AGCA	*Agrostis capillaris*	colonial bentgrass	Poaceae	weedy
BIFR	*Bidens frondosa*	sticktight	Asteraceae	weedy
BRHO	*Bromus hordeaceus*	soft brome	Poaceae	weed
BRJA	*Bromus japonicus*	Japanese brome	Poaceae	weed
BRRI	*Bromus rigidus*	ripgut brome	Poaceae	weed
BRTE	*Bromus tectorum*	cheat grass	Poaceae	weed
CESO3	*Centaurea solstitialis*	yellow star thistle	Asteraceae	noxious weed
CEGL	*Cerastium glomeratum*	sticky mouse ear	Caryophyllaceae	weedy
CHLE	*Chrysanthemum leucant*	ox eye daisy	Asteraceae	weedy
CIIN	*Cichorium intybus*	chicory	Asteraceae	weedy
CIVU	*Cirsium vulgare*	bull thistle	Asteraceae	noxious weed
COBO	*Conyza bonariensis*	hairy fleabane	Asteraceae	weedy
DIARA	*Dianthus armeria ssp.*	grass pink	Caryophyllaceae	weedy
DIFU	*Dipsacus fullonum*	wild teasel	Dipsacaceae	weed
ERSE3	*Eremocarpus setigerus*	turkey mullein	Euphorbiaceae	weedy
ERCI6	*Erodium cicutarium*	filaree, redstem storks	Geraniaceae	weedy
GEDI	*Geranium dissectum*	cut-leaved geranium	Geraniaceae	weedy
HOLA	*Holcus lanatus*	common velvet-grass	Poaceae	weed
HYPE	*Hypericum perforatum*	Klamathweed, goat weed	Hypericaceae	weed
HYRA	*Hypchoeris radicata*	false dandilion	Asteraceae	weed
LASE	*Lactuca serriola*	prickly lettuce	Asteraceae	weedy
MOEN	*Moenchia erecta*	moenchia	Caryophyllaceae	weed
MYDI	*Myosotis discolor*	yellow & blue scorpion-	Boraginaceae	weedy
PLLA	*Plantago lanceolata*	English plantain	Plantaginaceae	weedy
POPR	*Poa pratensis*	Kentucky bluegrass	Poaceae	weedy
PRVU	*Prunella vulgaris*	self-heal	Laminaceae	weedy
RARE3	*Ranunculus repens*	creeping buttercup	Ranunculaceae	weed
ROEG	*Rosa eglanteria*	sweetbriar rose	Rosaceae	weed
RUDI2	*Rubus discolor*	Himalaya berry	Rosaceae	weed
RUAC3	*Rumex acettosella*	sheep sorrel	Polygonaceae	weed
RUCR	*Rumex crispus*	curly dock	Polygonaceae	weed
TACA8	*Taeniatherum caput-me*	medusahead	Poaceae	weed
TAOF	*Taraxacum officinale*	dandelion	Asteraceae	weed

TOAR	*Torilis arvensis*	field hedge-parsley	Apiaceae	weedy
TRDU	*Tragopogon dubius*	yellow salsify	Asteraceae	weedy
TRDU2	*Trifolium dubium*	little hop clover, sham	Fabaceae	weedy
TRWI	*Trifolium willdenovii*	tomcat clover	Fabaceae	weedy
VALO	*Valerianella locusta*	corn salad	Valerianaceae	weedy
VEDU	*Ventenata dubia*	unknown	Poaceae	weedy
VETH	*Verbascum thapsus*	common mullein	Scrophulariaceae	weed
VUMY	*Vulpia myuros*	rattail fescue	Poaceae	weed

Lower Big Butte Grassland Ecosystem

Description, Treatment Prescription, Priorities, Short-term, Long-term Goals

Grassland Description	Treatment Priority	Treatment Prescription	Short Term Goals	Long Term Goals
Healthy grassland	MODERATE	1. No treatment leave as is. 2. BB site - Fall 3. Ground scorch or treat over 75% of area for grass seed bed establishment and reduction of non-native species seed. 4. Minimize mortality to largest diameter size class hardwoods.	1. Maintain health and vigor of existing native species. 2. Minimize potential of non-native invasion	1. Maintain health and vigor of existing native species. 2. Minimize potential of non-native invasion
Mixed native and non-native grasses and forbs	HIGH	1. BB site -Spring or Fall 2. Seed with native species 3. Ground scorch or treat over 75% of area for grass seed bed establishment and reduction of non-native species seed. 4. Minimize mortality to largest diameter size class hardwoods.	1. Maintain health and vigor of existing native species. 2. Increase natives by seeding natives, reducing non-native seed sources/seed bed, and stimulating existing natives. 3. Minimize potential of non-native invasion	1. Increase dominance of native grasses on site. 2. Reduce densities of non-natives on site.

Grassland Description	Treatment Priority	Treatment Prescription	Short Term Goals	Long Term Goals
Unhealthy grasslands	LOW OR MODERATE	1. No treatment - Abandon area or 2. BB site - Spring burn, 2 Seasons 3. Seed with native species 4. Ground scorch or treat over 75% of area for grass seed bed establishment and reduction of non-native species seed. 5. Minimize mortality to largest diameter size class hardwoods.	1. Complete vegetative conversion from non-natives to natives. 2. Establish native grasses on site. 3. Increase densities after 2nd burn. 4. Minimize potential of non-native invasion or dominance.	1. Establish native grasses on site. 2. Reduce densities of non-natives on site.

This analysis uses native grasses as an indicator of the health of the grass and forb community.

GRASSLAND DESCRIPTION

Three general grassland community types occur in the proposed project area. I have lumped many site specific characteristics together to simplify the analysis at this point and condense them into a table. Abiotic factors are not identified at this time, although many of the unhealthy grasslands appear to have a shallow soil profile that provides ideal conditions for non-native annual grasses. Brush, hardwood and conifer over-story cover are not discussed, but play a significant role in shifting species from one sweet of species into another. Some sites integrate in and out of over-story canopy. There are known chemical or mychorrozal relationships that occur between grasses, shrub, hardwoods and conifers that assist in their establishment and health. Also, increased shade at levels between 5% and 50 % approximately, improves native grasses vigor and density while reducing non-native species significantly. A brief description based on generalized grassland community components follows. :

1. Healthy grassland community - Site dominated by well established, vigorous native grasses. Species densities and diversity may differ from site to site. Very few non-native invaders occur.
2. Mixed native and non-native grasses and forbs - This community is a mixed area of native and non-native grasses and forbs. Native perennial grasses are scattered or occur in patches or clusters throughout the area and are intermixed with moderate amounts of non-native plants.
3. Mostly non-native grasses and forbs - This community is dominated by non-natives, either annuals or perennials. Native grasses are generally absent or occur in very low

densities. These sites are considered very weedy areas and generally difficult to restore without multiple treatments and high costs.

TREATMENT PRIORITY

Each site will be assessed to determine the treatment objectives, priority,goals and likelihood of success. Treatment priorities would be High, Medium or Low. The general guidelines for establishing a priority will be based on meeting the short-term and long-term goals and the following factors:

1. Current condition of the grassland
2. Quantity/density of existing native grasses
3. Risk of invasion or increase in non-native species component
4. Logistics or treatment advantages or difficulties
5. Chance of success in meeting short-term and long-term goals

TREATMENT PRESCRIPTION

This column will briefly describe the methodology to acheive the short-term and long-term goals. Time of year, brush component and encroachment, burn intensity, number of treatments and types of treatments are the main criteria considered to achieve success.

SHORT-TERM GOALS

Ecological goals expected within 1 to 5 years. Both native species and non-native species consideration are included in this column. Issues such as re-treatments, community stability and vigor are addressed. Risks and probabilities of success and failures may be included.

LONG-TERM GOALS

Ecological goals expected within 5 to 10 years. Both native species and non-native species consideration are included in this column. Issues such as re-treatments, community stability and vigor are addressed. Risks and probabilities of success and failures may be included.

Appendix C

March 4, 2002

TO: Lower Big Butte E.A. File

FROM: Linda Hale, wildlife biologist

SUBJECT: Wildlife Report

DESCRIPTION OF THE EXISTING ENVIRONMENT

Special land designations for wildlife in the Lower Big Butte Creek Watershed: Five Northern spotted owl (NSO) activity centers are within the watershed boundaries. Other wildlife designations are late-successional connectivity block (T. 34S, R. 2E, Section 21), "Big Game Winter Range and Elk Management area" in the northwest part of the watershed west of Crowfoot Road (T. 34 S., R. 1E., Sections 9, 10, and 17) and NSO "critical habitat" in the Clark Creek drainage.

T&E SPECIES

Northern Spotted Owl

Three sections within the Clark Creek drainage fall within NSO owl critical habitat unit (CHU) OR-36. This area is currently deferred from timber harvest (Medford BLM District Resource Management Plan Record of Decision [RMP], P.43). No timber harvest is proposed in designated NSO Critical Habitat.

One hundred acre activity centers are established around five NSO sites. The sites will be managed as Late-successional reserves (LSR). The activity centers are 100 acres of the best habitat as close to the activity center as possible for all NSO centers known as of January 1, 1994 (*Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl Standards and Guidelines* [ROD], P. C-10).

Three additional NSO sites have been found in the watershed. Activity centers were not established for these sites because they were discovered after January 1, 1994. Surveys were conducted in 2001. No NSOs were found at two of the sites. The third site has a pair of NSO which have not been found to be nesting in the two years since the site was discovered.

Section 21, T. 34S, R. 2E is a RMP/ROD connectivity block. ROD requirements are to maintain 25-30% of the connectivity block in Late-successional forest, maintaining the best Late-successional habitat. Ninety-three acres of the best Late-successional habitat in the section outside the NSO activity center have been deferred from harvest at this time. When added to the 100 acre NSO LSR activity center, 193 acres would be deferred from harvest. This will maintain 30% of the connectivity block in Late-successional condition.

Bald Eagle

A proposal to remove the American bald eagle from threatened status was considered by USFW in 2000. USFW decided to delay the decision until more information is processed. Bald eagles remain T&E species.

A bald eagle nest was found near Big Butte Creek in 1999. The eagles have not nested in the nest since it was discovered. The nest will be checked annually to learn if it is occupied. A buffer has been established around the nest and a seasonal restriction on actions within ¼ mile (½ mile line of sight) would be in place from January 1-August 15 for any year nesting occurs.

SURVEY AND MANAGE

Great Gray Owl

Surveys for great gray owl have been completed to Current Interagency Protocol (April 1995). Four nests were found. A ¼ mile protection buffer has been established around these nests. No management is currently planned in these protection buffers. A seasonal restriction from March 1 - August 1 would be in effect ¼ mile from any active nest site.

Mollusk

Mollusk surveys were completed using current protocol in effect at the time, *Survey Protocol for Terrestrial Mollusk Species From the Northwest Forest Plan, Version 2.0*. One unknown mollusk specimen was located which had some characteristics similar to *Monadenia chaceana*. This specimen has been sent off for identification, and no positive identification has been received. The site will be treated as though it is a survey and manage specimen and the unit boundary will be moved to avoid the site. No other survey and manage mollusks were found.

Red Tree Vole

Red tree vole surveys were completed on all proposed timber sale units using protocol in effect at the time, Interim Version 1.0. No red tree voles or any suspected red tree vole nests were found.

No resin duct clumps or other evidence of red tree vole were observed.

Survey and Manage Protocol for Red Tree Vole, Version 2 was received in February 2000. The Lower Big Butte project area is outside the known or suspected geographic range of the red tree vole (*Survey Protocol for the Red Tree Vole, Version 2.0, P. 5*). Surveys are no longer required in the watershed.

SENSITIVE SPECIES

A review of special status species that could occur in the Butte Falls Resource area was completed (see attached table).

The proposed actions, while potentially adversely disrupting local individuals of sensitive wildlife species and causing loss of habitat in some cases, is not expected to affect long term population viability of any species known to be in the area.

Goshawk

Two years of goshawk surveys were done in timber stands that appeared most likely to provide good goshawk habitat. Two nests were found within the watershed. One nest was protected with a 30-acre buffer adjacent to a NSO activity center. The connectivity block south of the goshawk nest stand has 193 acres of the best Late-successional habitat reserved from timber harvest activity. Two hundred and thirty-three acres would remain protected from timber harvest near the nest site. The second goshawk nest is in a NSO activity center that has 100 acres protected from harvest.

None of the proposed actions is expected to have significant impacts to the species, nor lead to the need to list the goshawk as T&E. A seasonal restriction would be effective March 1 through August 30 for actions within ¼ mile of known nest sites.

A petition to list the Northern goshawk in the western United States as a threatened species was considered by USFW in 1998. The final conclusion was published in *USFW Federal Register notice dated June 29, 1998 Volume 63, Number 124, page 35183-35184.* The decision states: "After review of all available scientific and commercial information, the Service finds that listing this population as endangered or threatened is not warranted." USFW found no evidence to support contention that the goshawk is in danger of extinction nor that the species is likely to become endangered in the foreseeable future throughout all or a significant portion of its range. They found no evidence that goshawk habitat is limiting the population, or that a significant curtailment of the species habitat or range is occurring.

The Federal Register also states that the U.S. Fish and Wildlife Service found that, while the goshawk typically does use mature forest or larger trees for nesting habitat, it appears to be a forest habitat generalist as to the types and ages of forests it will use to meet its life history requirements. Goshawks can use small patches of a mature habitat to meet their nesting requirements within a mosaic of habitats of different age classes. While USFW noted that timber management has been shown to affect goshawks at local levels, forest management practices, such as the use of prescribed fire and selective thinning, also may make habitats more suitable to goshawks by opening dense understory vegetation, creating snags, down logs, and woody debris, and creating other conditions conducive to goshawks and their prey.

In the Butte Falls Resource Area, goshawk nests have been found in two timber sale units after the units were commercially thinned. One goshawk pair nested the year after the sale was completed, and the second goshawk pair nested the second summer after the unit was harvested. There is no evidence that any of the proposed actions would lead to the need to list goshawk as a T&E species.

Other Raptors

A kestrel and a sharp shinned hawk nest were found during field surveys. These nests are being buffered with a no-entry buffer of 5 acres for the kestrel nest and 10 acres for the sharp shinned hawk nest. A seasonal restriction from March 1 through August 15 would be in place for activities within ¼ mile of the nests if they are active. This buffer and the adjacent stands would continue to provide nesting, roosting, and foraging habitat for these birds.

Bats

No known caves, mines, abandoned wooden bridges and buildings are within any proposed timber sale unit. Townsend's big-eared bats are present in a cave at Poverty Flat. No timber harvest is proposed in this section. Snags and large hollow oaks would be left in the proposed units to provide roosting habitat.

OTHER WILDLIFE SPECIES

Cavity Nesters

Snags and coarse wood. All of the proposed action alternatives would meet minimum ROD standards for snag retention where it currently exists. Extra trees would be left to meet future snag requirements where currently deficient numbers exist in the units proposed for regeneration harvest. An average of two snags per acre would be left to meet snag requirements. Coarse

wood would meet 120 linear feet of logs per acre greater than or equal to 16 inches in diameter and 16 feet long in decay class one and two.

Game Animals

Big Game Winter Range and Elk Management Area. Approximately 820 acres to the west of Crowfoot Road within the watershed boundary is designated in the Medford District RMP as "Big Game Winter Range and Elk Management Area". This is a small part of the large winter range and management area between Crowfoot Road and the Rogue River which overlaps with the Lower Big Butte watershed. Guidelines in designated winter range are to maintain at least 20% of the area in thermal cover and observe a seasonal restriction to avoid disturbance from November 15 to April 1.

Thermal cover for deer is shrubs or trees at least 5 feet tall with 75% canopy or pole size trees and large trees with a 70% canopy. Elk thermal cover is a forest stand at least 40 feet in height with tree canopy cover at least 70%. This is achieved in many closed sapling-pole stands. Thermal cover modifies extremes in temperature, wind speed, and solar radiation, and provides security from disturbance and predators. Adequate thermal cover is present in the winter range.

Seasonal restriction recommendations in winter range are to close all roads except major collectors and arterial during the seasonal restriction and minimize new road construction. The two access roads into this area with BLM control are currently gated. These roads are included in the Oregon Dept. of Fish and Wildlife Jackson Cooperative Travel Management area and are closed to vehicle traffic from November 15-April 30.

Wild turkeys are present in the watershed. Maintaining and improving oak-savannah woodlands, grasslands, and maintaining large roost trees near the meadows would help these populations maintain healthy numbers. Quail and grouse are common in the area.

Neotropical Migratory Land Birds

Neotropical migratory birds are present during spring, summer, and early fall. A road survey was conducted along Cobleigh and Dog Creek roads in the spring of 1995 and 1996 to develop a list of bird species in the watershed at that point in time.

SPECIAL OR UNIQUE HABITATS

Oak woodlands/savannah

Oak woodlands/oak savannahs are generally declining. Oregon white oak is a fire dependent

species. According to a report by James Agee and Mark Huff (The Role of Prescribed Fire in Restoring Ecosystem Health and Diversity in Southwest Oregon, September 2000), research has found area and perimeter of forest openings in the Klamath Mountains has decreased from 26% to 16%. The lack of fire has resulted in oak thickets with reduced growth and conifers encroaching into the woodlands and meadows. This has slowed development of large open grown "savannah" oak trees that provide natural cavities and acorns and are important to a variety of wildlife species.

Shrub/wedgeleaf chaparral/grasslands

Shrub lands. Generally, fire is the primary agent for creating and maintaining early seral stage shrub and grass plant communities. Lacking fire, much of this habitat type has matured and is becoming decadent, with tough woody or dead branches and less tender, palatable new shoots. As a result, the habitat quality of the grass and shrubs important for wildlife is decreasing (*Lower Big Butte watershed analysis*, pg 19). Dense stands of manzanita create barriers to big game movement and reduce the amount of available forage. Hunting opportunities for great gray owl, great horned owl, and other raptors, such as red tail hawks are also hindered by dense shrub communities.

Grasslands. The quantity and quality of grass/forb/herbaceous habitat through the watershed have declined due to the invasion of nonnative grasses and forbs and the encroachment of shrubs and conifers into the grasslands. Encroachment has primarily been the result of human activities, such as roads, grazing, and fire exclusion over the past century. Competition from nonnative plants, primarily star thistle and medusa head in the lower elevations have reduced native forbs and grasses. Many nonnative species are not palatable to wildlife. This has reduced the amount and quality of forage. In a more natural system, fire kills many developing shrubs, oaks, small conifers and maintains an open stand of grass savannah.

ENVIRONMENTAL CONSEQUENCES

T&E SPECIES

The proposed timber sale would occur on Matrix lands and meets requirements of the Forest Plan Final Supplemental Environmental Impact Statement (FSEIS) which was consulted with USFW. One hundred acre activity centers have been designated LSR and would not be entered. These activity centers and the riparian reserves 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 NSO.

All proposed actions may adversely affect NSO. Formal consultation with USFW has been

completed. The project would be covered under ROGUE RIVER/SOUTH COAST FY 01/02/03 MEDFORD DISTRICT, Bureau of Land Management, ROGUE RIVER and SISKIYOU National Forests BIOLOGICAL ASSESSMENT 18 July 200l and Biological Opinion (FWS) 1-7-01-032, 12 October 2001.

COMPARISON OF NSO ESTIMATED HABITAT DISTURBANCE

Alternative	*Suitable NSO habitat proposed for entry*	*Acres Habitat 1* to dispersal*	*Acres Habitat 1 to non-suitable*	*Acres Habitat 2* to dispersal only*	*Acres Habitat 2 to non-suitable*	*Owl nest stand regen. harvested*
No Action	0	0	0	0	0	0
Alternative 2	1310	140	30	846	294	1
Alternative 3	1209	170	0	894	145	0
Alternative 5	900	160	0	740	0	0

Table 1: Spotted owl habitat effects by alternative

*Habitat 1 - Nesting, foraging, roosting, and dispersal
Habitat 2 - Meets foraging, dispersal and roosting

A seasonal restriction would be in effect for all activities within ¼ mile of any site containing NSO. Known sites in the watershed within ¼ mile of any proposed project area would be checked in the year of the action to determine nesting status. Mandatory project design features in the USFW BO would be followed. (See project design features)

Because the proposed action would occur within ¼ mile of a bald eagle nest, the action "may affect" the bald eagle. Formal consultation with USFW has been completed. The project is covered under ROGUE RIVER/SOUTH COAST FY 01/02/03 MEDFORD DISTRICT, Bureau of Land Management, ROGUE RIVER and SISKIYOU National Forests BIOLOGICAL ASSESSMENT 18 July 200l and Biological Opinion (FWS) 1-7-01-032, 12 October 2001. Management recommendations in the USFW BO would be followed.

EFFECTS OF ALTERNATIVE 1--NO ACTION

Threatened and Endangered Species

The No Action Alternative would have "no effect" on the NSO. In some areas where dense

conifer thickets are present, "No Action" would result in slower development of larger overstory trees due to competition for light, nutrients, and moisture. Fire risk is higher in areas with high levels of ladder fuels and tight canopies. This could leave adjacent NSO habitat at higher risk of being burned if a wildfire were to occur in the area.

Large old growth trees across the canyon from the bald eagle nest would be available for potential nest structures and roost perches. Potential for snags to provide roost and perch sites in the vicinity would continue at present rates.

Repair of the pump chance would not occur. Currently wildlife species do not have access to water in the pond as the water flows under a mat of gravel and vegetation.

Other Wildlife

Current trends of wildlife habitat and wildlife populations would continue. Skid trails would not be built and current levels of habitat would remain to develop naturally. Coarse woody debris and snag numbers would increase due to some disease within the watershed. This would benefit species that depend on snags and coarse wood.

Great gray owl buffer areas adjacent to meadows where smaller understory conifers are dense and crowded together would not be thinned. Habitat near the meadows where the dense understory conifers are a barrier to flight from the forest to the meadows would remain. Conifers would continue to encroach into the meadows, and meadow habitats would continue to decline.

Non-native weeds in the meadows would continue to impede growth of native species in Poverty Flat and other meadows unless fire and reintroduction of native seeds occurs.

Oak woodlands/chaparral/grassland

Without prescribed fire, current trends in the oak woodlands and wedgeleaf chaparral would continue. In sections 17 and 20, T. 35S, R. 2E, the large areas of mature wedgeleaf would continue to develop and wildlife forage would continue to decline. Open grasslands would not have the flush of nutrients that occur after a fire. Proposed seeding of native grasses would not occur. Noxious weed species would continue to dominate the grasslands. Conifers would continue to encroach into the oak woodlands/oak savannah. Grassland would be slowly converted to brush fields in many areas.

SHORT TERM USES VS LONG TERM PRODUCTIVITY

Timber harvest would not cause loss of habitat for late-successional dependent species. A long term increase in productivity for the late-successional dependent species is expected to occur.

Some areas that would not be thinned or burned would develop late-successional characteristics more slowly, especially in the oak woodlands. There would be no loss of patches of old growth habitat.

Species which depend on open grassland and early seral shrub land, such as great gray owl, deer, elk, etc. would continue with current trends in the short term, but long term productivity could be affected with loss of grass savannah due to tree encroachment and mature shrub development. There is some concern in Southern Oregon about blacktail deer populations declining. One of the factors identified by Oregon Dept. of Fish and Wildlife (ODFW) which may be a contributing factor is declining forage.

IRREVERSIBLE/ IRRETRIEVABLE COMMITMENT OF RESOURCES

None identified.

CUMULATIVE EFFECTS

No change from expected current trends within the watershed. Private lands are being harvested and most will remain in early-to-mid seral condition.

EFFECTS OF ALTERNATIVE 2

Threatened and Endangered Species

This alternative would affect the NSO to the greatest extent due to loss of nesting/roosting/ foraging habitat and disturbance. Under Alternative 2, one unit with a NSO pair without an activity center is proposed for regeneration harvest. Loss of habitat in the unit through thinning in the adjacent stand would result in the birds being forced to relocate. The site would be monitored before beginning the action and a seasonal restriction would be in effect from March 1 through September 30 if the owls are present. The site would be monitored before beginning the action and a seasonal restriction would be in effect from March 1 through September 30 if the owls are present. The pair does not have a 100-acre activity center because it was discovered after January 1, 1994. This is consistent with the Forest Plan ROD.

Consultation with USFW has been completed and the action meets the FSEIS and RMP ROD minimum guidelines. A ¼ mile seasonal restriction would be in place to reduce noise and activity disturbance to active NSO sites during times when the owls are nesting and/or young or adults are present. The proposed project meets all ROD and RMP standards and guidelines and will follow mandatory project design features for NSO in the BO.

Alternative two would have the greatest impact to NSOs of the four alternatives considered. This

proposal would remove approximately 32 acres of low elevation old growth habitat The alternative would reduce suitable NSO habitat (nesting/foraging/roosting and foraging/roosting) to the greatest amount of the three action proposals. Approximately 1310 acres of suitable NSO habitat would be entered (see Table 1).

Under Alternative 2, regeneration harvest would occur on the west side of the Big Butte Creek canyon ½ mile from the bald eagle nest. The nest is located east of the creek. This is an old growth stand on the edge of the canyon west of the nest. The stand would only provide limited potential for eagle nesting on the west side of the canyon above Big Butte Creek. The larger overstory trees left to meet ROD requirements would provide some potential future nest or perch trees.

Also in section 25, T. 34S, R. 1E, one unit proposed for select cut/commercial thin is within ¼ mile of the eagle nest. Thinning by removing the competing smaller trees is expected to increase the growth of overstory trees, improving the potential for future large conifers to the north of the nest. No trees over 30 inches would be cut within 1/4 mile of the nest. A seasonal restriction from January 1-August 31 would be in effect for actions within ¼ mile of the nest if it is active (½ mile for line-of-sight).

Mandatory Project Design Features (PDF) from the USFWS would be followed. No known nest, roost, or perch trees will be cut and suitable bald eagle habitat will not be removed within ¼ mile of a known nest or roost site. No eagle perches (large snags, dead top trees, etc. within ½ mile of nests or roosts will be cut and a seasonal restriction on work activities within ¼ mile of the nest will be in effect (½ mile line of sight).

Other Wildlife

Alternative two would have the greatest loss of future snags and coarse woody debris due to the higher number of acres proposed for regeneration harvest. Minimum ROD standards and guidelines would be met.

Snags may need to be felled for safety reasons under all proposed action alternatives. These would be left on the site to provide coarse wood. This could result in the loss of a cavity nester habitat, and could disrupt the nesting/breeding cycle for some species, depending upon the season the unit is harvested.

Cover and nesting substrates for birds would also be removed. There is little low elevation old growth in the Lower Big Butte watershed and Alternative 2 would remove the greatest amount of old growth of the three action alternatives considered. Buffers for the survey and manage species (fungi, lichens, and plants) would preserve small patches of habitat for hiding cover and nesting

birds. Intact patches of understory trees will be left in the units and at unit edges to provide thickets for nesting. This would provide an understory patch of shrubs and small trees that would provide >40% cover.

Some birds will benefit from the density management, thinning from below. Birds such as Hammond's flycatcher, which are aerial insectivores, require open areas beneath the forest canopy for adequate foraging space because a low tree density allows clear flight paths to capture flying insects.

Prescribed fire in late spring could result in the loss of some bird nests. Usually prescribed fire would occur when conditions are dry enough to burn, but still moist, mostly early in the spring before nesting is established. Most prescribed fire is completed by April or May, although some areas may not dry enough to burn until later in late spring. As a result, this could cause the loss of the breeding opportunity for that year. Some birds may be able to re-nest. Others would not successfully nest in the year of the burn. Spring burning often creates a mosaic with patches of brush and cover that do not burn due to moisture conditions, but the loss of some bird habitat and potentially, nestlings would be expected. This is an unavoidable direct impact of prescribed fire. No more than 1/3 of an area would be burned in any year to protect habitat for nesting birds and small mammals. The proposed action, while it could affect some individual nesting birds and mammals, would not be expected to affect the long term population viability of any known species.

There is no planned take of any individual birds as part of any of the proposed actions.

Prescribed fire would improve conditions in the meadows and wedgeleaf patches. Open grasslands would have a flush of nutrients resulting from prescribed fire. Conifer encroachment would be reduced in the areas where prescribed fire intensity would kill small conifers.

Potential great gray owl nesting habitat within the regeneration harvest units and areas where large overstory trees are removed would be reduced. Canopy closure is apparently not always necessary for great gray owl nests. In the Butte Falls and Ashland Resource Areas, great gray owls have been observed nesting in large raptor stick nests and in broken top trees with a variety of canopy cover, ranging from a high canopy to little or no canopy above the nest. The adjacent forest stands are generally large open, late successional/old growth stands which are open beneath the tree canopy.

Loss of overstory would be the greatest under Alternative 2. This would also result in the greatest loss of great gray owl habitat. Two units in section 19, T 35S, R2E proposed for regeneration harvest are in an area where great gray owls were observed during surveys for goshawks. Return visits have not detected great gray owls and no nests were found in the area. The area was surveyed for two additional years with no great gray owl sightings after the first

detection.

Great gray owls use openings in regeneration harvest units for foraging for a few years until vegetation becomes established. Alternative 2 has the highest amount of regeneration units. This could provide improved hunting opportunities for approximately 5-10 years. Pre-commercial thinning of small trees within the 300-foot meadow buffer would occur. This would improve the area for flight and reduce the encroachment of conifers into the meadows, and would be expected to improve growth in the larger overstory trees due to less competition from the understory trees. A ¼ mile seasonal restriction for disturbance would be in place near great gray owl nests. Nests would be protected with a ¼ mile protection zone.

Hardwood conversion (38 acres) in sections 11 and 13, T. 35S, R. 1E is proposed under Alternative 2. The proposal would harvest most of the hardwoods in a stand that has predominantly madrone, chinquapin, and oak with little conifer regeneration beneath the hardwood canopy and replant conifers. The hardwood stand provides good berry and nut crops for wildlife. No regeneration harvest of these stands would occur under Alternatives 3 and 5.

Repair of the pump chance would make water available for wildlife in the Geppert Butte area.

Meadow burning at Poverty Flat would occur during a outside the maternity season and would not occur within 250 feet of the cave.

SHORT TERM USES VS. LONG TERM PRODUCTIVITY

Timber harvest under Alternative 2 would result in the greatest loss of habitat for late-successional dependent species. These species would not be expected to recover until late-successional conditions recur, perhaps 80-100 years. The proposal meets minimum ROD and RMP guidelines.

There would be an expected immediate reduction of forage for grazing and shrub browsers in the short term due to fire. However, this would improve when the regrowth occurs. Observations from past prescribed fire projects in the Butte Falls Resource Area show that new growth begins when the fall or spring rains soak the soil. Deer and elk move into the areas when the grass begins to grow.

Cover would be reduced in the wedgeleaf areas from the crushing action. Native grasses would be planted in some areas proposed to be burned. This would help reestablish the native grasses and reduce the noxious weeds in areas where they could out compete the nonnative species. In the long term, reestablishment of native grasses would improve forage for wildlife, including birds. Patches of brush inside the units and along the edges would be left for hiding cover and nesting habitat. This would help provide for the long term viability of species affected by the

action.

IRREVERSIBLE/ IRRETRIEVABLE COMMITMENT OF RESOURCES

No irreversible effects are identified. Irretrievable commitments would be loss of 200 acres of large overstory trees years in the regeneration harvest units. Since the lands are currently matrix land allocation and are expected to be managed for timber production, it is unlikely that these acres would provide habitat for old growth (200+ years) species in the long term, as they would be available for harvest under the current forest plan. Habitat and connectivity for late successional species would be provided by riparian reserves and LSR patches in the Matrix.

CUMULATIVE EFFECTS

Most private timberlands in the Lower Big Butte watershed have been harvested and are in shrub, pole, or large pole conditions. Little mature timber is present on private lands. Dispersal for late successional species would be provided by patches of late-successional habitat on public lands (15%), including NSO activity centers, connectivity block reserved acres, and riparian buffers.

Proposed thinning in riparian reserves would not remove large overstory trees, but would target small understory and suppressed trees to improve tree growth to attain the larger diameter in these areas. This should have no impacts to the function of the overstory of the riparian reserve for wildlife dispersal between watersheds.

EFFECTS OF ALTERNATIVE 3

Threatened and Endangered Species

Approximately 5200 acres are proposed for treatment.

Under Alternative 3, regeneration harvest would not occur west of Big Butte Creek in section 25, T. 34S, R. 1E. The patch of old growth habitat across the canyon from the eagle nest would be left intact. This would protect large conifer trees on the rim of the canyon above Big Butte Creek and leave one of the remaining old growth forest patches in the low elevations in Lower Big Butte Watershed. There would be an expected increase in the number of snags through time along the rim if timber harvest does not occur. These snags would provide future eagle roost and perch trees above Big Butte Creek. Retention of the large Douglas fir and pine trees on the west side of the creek would provide a patch of habitat with potential for future eagle nest sites.

As in Alternative 2, in section 25, one unit proposed for select cut/commercial thin harvest would

occur within ¼ mile of the eagle nest. Thinning would occur in this area, but the larger trees and snags that provide suitable bald eagle habitat would not be removed. A seasonal restriction from January 1-August 31 would be in effect for actions within ¼ mile of the nest if it is active (½ mile for line-of-sight).

This alternative would likely adversely affect the NSO. Approximately 1209 acres of suitable spotted owl habitat would be entered under Alternative 3 (see Table 1). Alterative 3 would protect more of the available NSO habitat than Alternative 2, but less than Alternative 5. A ¼ mile seasonal restriction would reduce noise and activity disturbance to the NSO and great gray owl nests if they are active.

Alternative 3 would protect the old growth stand where the pair of NSO pair in section 25 is found. Harvest in the unit would be deferred under Alternative 3. Under Alternative 2, the owls would be forced to move out of the area where they currently are found. Alternative 3 would protect a 32-acre patch of old growth forest where the owls were found in 2000 and 2001. The adjacent stand would be thinned, the same as Alternative 2. This stand would remain dispersal habitat after the action.

The late-successional forest where the owls are currently found is not expected to be large enough for the owls to establish a long term nesting site, as it is surrounded by private lands which are early to mid seral vegetative condition. However, deferring harvest in this patch of old growth habitat would provide an area suitable for NSOs that are dispersing through the watershed.

Other Wildlife

Hardwood conversion in section 11 and 13, T. 35S, R. 1E would not occur under Alternative 3. The stand would continue to be a dense hardwood stand with madrone, chinquapin, and oak with little conifer regeneration beneath the hardwood canopy. The area currently provides a NSO roosting and foraging habitat. The patch of hardwoods provides neotropical birds and small mammals foraging and nesting opportunities.

Future coarse woody debris and snag numbers would decrease below what is naturally occurring. Another stand of old growth timber in section 17 would not be entered under Alternative 3.

Great gray owl nesting habitat in harvest units where large overstory trees are removed would be reduced. Loss of habitat for great gray owls would be the less than Alternative 2, but greater than Alternative 5. Understory thinning of small trees within the 300-foot meadow buffer would occur in areas where thick understory vegetation would provide ladder fuels into the overstory. Cutting pre-commercial size trees would improve the area for flight and reduce the encroachment of conifers into the meadows, and would be expected to improve growth in the larger overstory

trees due to less competition from the understory trees. No commercial harvest would occur within these buffers.

Cover and nesting substrate for some land birds would also be removed through this proposed action, less than Alternative 2, but more than Alternative 5. Buffers for the survey and manage species (fungi, lichens, and plants) would preserve small patches of habitat that could be used for hiding cover and nesting birds. The proposed action, while affecting local individuals and causing the loss of habitat, and possibly disrupting the nesting cycle in the year the action occurred, would not have significant effects to the populations of land birds. Thickets of small trees would be left in sale units and at edges of sale units to provide habitat for birds. No more than 1/3 of an area would be burned in any year, which would preserve patches of nesting habitat and cover.

Effects of prescribed fire would be the same as Alternative 2.

Effects of repairing the pump chance would be the same as Alternative 2.

SHORT TERM USES VS. LONG TERM PRODUCTIVITY

In the regeneration harvest areas, loss of habitat for late-successional dependent species would occur. These species would not be expected to recover until late-successional conditions re-occur, perhaps 80-100 years. Since there would be less regeneration harvest with this proposed alternative, there would be less loss of late-successional habitat than proposed Alternatives 2, but more than 5.

As in Alternative 2, there would be a reduction of forage in the short term due to fire disturbance before grasses and shrubs put out new growth. However, this would improve when growth occurs after the rains begin. Fire would result in a flush of nutrients into the soil, and the new grasses would be more nutritious in the short term. In the long term the area would return to current conditions unless the area is burned again. Current plans are to burn the meadows and openings on a regular schedule approximately every 5-10 years to maintain the health of the grasslands. Shrub cover would be reduced in the wedgeleaf areas in section 17, 19 and 20 because of the crushing action and fire.

IRREVERSIBLE/ IRRETRIEVABLE COMMITMENT OF RESOURCES

No irreversible effects are identified. Irretrievable commitments of would be loss of larger overstory trees for the next 80 to 100 years in the regeneration harvest units. Since the lands are currently matrix land allocation and are expected to be managed for timber production, it is unlikely these acres would provide habitat for old growth species in the long term, as they would be available for harvest under the current forest plan. Habitat and connectivity for late

successional species would be provided by riparian reserves and LSR patches in the Matrix.

CUMULATIVE EFFECTS

Private industry logging has removed most of the large older forest on private lands in within watershed. Most of the private timber lands in the watershed would be expected to remain in early-to-mid seral condition.

Proposed thinning in riparian reserves would not remove large overstory trees, but would target small understory and suppressed trees to improve tree growth to attain the larger diameter in these areas. This should have no impacts to the function of the overstory of the riparian reserve for wildlife dispersal between watersheds.

EFFECTS OF ALTERNATIVE 5

Approximately 4800 acres are proposed for treatment.

Threatened and Endangered Species

This alternative would likely adversely affect NSO. Alternative 5 would be least impacting of the three proposed action alternatives. Approximately 900 acres of suitable NSO habitat would be proposed for entry. No regeneration harvest is proposed. Alterative 5 would protect more of the available NSO habitat than Alternatives 2 and 3 (see Table 1). Timber harvest would only occur in areas where density management was prescribed to reduce the fire hazard in the watershed.

No actions are proposed in the section where the NSO pair were found in section 25. There would be no disturbance to the owls or to the eagles above current levels on adjacent private lands. A ¼ mile seasonal restriction would be in place to reduce noise and activity disturbance for the NSOs nests if they are active.

No action would occur within ½ mile of the eagle nest.

Other Wildlife

Hardwood conversion would not occur in sections 11 and 13.

This proposal would leave more potential future snags and coarse woody debris than Alternatives 2 and 3.

Some great gray owl nesting habitat would be entered where the hazardous fuel buffers would occur on the ridges. The ¼ mile protection buffer around known nests would be maintained. There would be more great gray owl nesting and foraging habitat retained under Alternative 5 than with the other action alternatives. In the Butte Falls Resource Area, great gray owl nests have been found in open areas with no overstory vegetation, but they all occur near forests that are open beneath the forest canopy for free flight. Regeneration harvests would not occur and there would be less foraging habitat under Alternative 5 than in Alternative 2 or 3.

Understory thinning of small trees within the 300-foot meadow buffer would occur in areas where dense understory trees would provide ladder fuels into the overstory. Cutting the smaller pre-commercial size trees would improve the area for flight and reduce the encroachment of conifers into the meadows, and would be expected to improve growth in the larger overstory trees due to less competition from the understory trees.

Cover and nesting substrate for some birds would also be removed through this proposed action. Buffers for the survey and manage species (fungi, lichens, and plants) would preserve small patches of habitat that could be used for hiding cover and nesting birds. The proposed action, while affecting local individuals and causing the loss of habitat, and possibly disrupting the nesting cycle in the year the action occurred, would not be expected to have significant effects to the populations of land birds. Because less timber harvest would occur under Alternative 5, more habitat would be retained. Thickets of small trees would be left in sale units and at edges of sale units to provide habitat for birds. No more than 1/3 of an area would be burned in any year, which would preserve patches of nesting habitat.

Effects of prescribed fire would be the same as Alternative 2.

Effects of repair of the pump chance would be the same as Alternative 2.

SHORT TERM USES VS. LONG TERM PRODUCTIVITY

Less harvest is proposed in Alternative 5 and more habitat would be available in the short term. Long term productivity would be expected to improve in some stands where thinning would occur to reduce competition for light, moisture and nutrients.

As in Alternative 2 and 3, there would be an expected reduction of forage in the short term due to fire disturbance before grasses and shrubs put out new growth. However, this would improve within one year, when nutritious growth would be expected. Cover would be reduced in the wedgeleaf areas because of the crushing action. Plans are to maintain the use of fire in the watershed on a rotational basis. This would lead to an overall reduction in the chaparral/brush habitat that some birds use for nesting and foraging. This would return the watershed to more "historic" conditions with more open grasslands with fewer overall dense wedgeleaf stands.

Forage for deer and elk would improve in the long term.

Cover and nesting substrate for some birds would be removed through this proposed action. However, under this proposal, no shelterwood, select cut, regeneration harvest, or hardwood conversions are proposed. Other buffers for the survey and manage species, mollusks, fungi, lichens, and plants would help preserve small patches of habitat that could be used for hiding cover and nesting birds.

Prescribed fire effects would be the same as Alternative 2.

IRREVERSIBLE/ IRRETRIEVABLE COMMITMENT OF RESOURCES

None identified.

CUMULATIVE EFFECTS

Private industry logging has removed most of the large older forest on private lands in within watershed. Most of the private timber lands in the watershed would be expected to remain in early-to-mid seral condition.

PROJECT DESIGN FEATURES

- No known bald eagle nest trees, perch trees, or roost trees would be cut. Suitable eagle habitat within ¼ mile of the nest would not be removed. Large snags within ½ mile of the nest would not be cut, except as needed to protect human safety.

- Seasonal restriction January 1-August 31 for work activities within ¼ mile (½ mile line-of- sight) from eagle nest, if occupied.

- Seasonal restriction March 1- June 30 within ¼ mile of known NSO sites. May be waived if nesting or reproductive success surveys reveal that NSOs are non-nesting or no young are present. The action agency biologist has the option of extending the restricted season during the year of harvest, based on site-specific knowledge (such as a late nesting attempt).

- If nesting and hatching year (fledgling) NSOs are suspected within, or immediately adjacent to a project area, the project activity would be delayed until September 30 or until an action agency biologist determines that young are in a location where they would not be impacted by the proposed action. This may be waived in a particular year if nesting or reproductive success surveys conducted according to current survey guidelines

reveal that NSOs are non-nesting or that no young are present that year. Waivers are valid only until March 1 of the following year. Previously known sites/activity centers are assumed occupied unless surveys show otherwise.

- Buffer meadows and natural openings with 300 foot no commercial harvest buffer (pre-commercial thinning would be allowed).

- Protect known great gray owl nests with ¼ mile (125 acre) buffer. Observe seasonal restriction March 1 through unless surveys reveal owls are not nesting or no young are present.

- Seasonal restriction and road closure in designated Big Game Winter Range from November 15 to April 1.

- Meet ROD requirements for CWD (120 linear ft 16' X 16" min) and snags (2 snags/acre).

- Protect kestrel nest with 5 acre no-harvest buffer and seasonal restriction for activities within ¼ mile of nest tree from March 1-June 15.

- Protect sharp shinned hawk nest with 10 acre no-harvest buffer and seasonal restriction for activities within ¼ mile of nest tree from March 1-June 15.

- Seasonal restriction within ¼ mile of Northern goshawk nest from March 1 through August 30.

BUTTE FALLS RESOURCE AREA
2002 SPECIAL STATUS SPECIES REVIEW

PROJECT NAME Lower Big Butte Projects

U.S.F.W./OREGON T&E SPECIES

SPECIES	STATUS	RANGE (Y/N)	P/A	HAB. QUAL.	SURVEY LEVEL	COMMENT
Bald eagle	FT, ST	Y	P	Medium	High	Nest & known perch trees protected
Northern spotted owl	FT, ST	Y	P	Medium	Thorough	LSR & Seasonal Restriction
Peregrine falcon	SE, BS	Y	A	Absent	None	No suitable cliffs
Vernal pool fairy shrimp	FT	N	A	N/A	Limited	Checked vernal pools at Poverty Flat

STATE CRITICAL AND BUREAU SENSITIVE SPECIES

SPECIES	STATUS	RANGE (Y/N)	P/A	HAB. QUAL	SURVEY LEVEL	COMMENT	PROJECT RESULT-- T&E LIST
Western pond turtle	SC, BS	Y	P	Low	Checked known ponds on BLM	None found on BLM land. Present in private farm ponds	NO
Black-backed woodpecker	SC	N	A	NA	NA	None documented	NO
Northern goshawk	SC, BS	Y	Y	Medium	Thorough	Surveyed; Known nests protected	NO
Flammulated owl	SC	Y	S	Medium	Limited	Surveyed with no detections	NO
Great gray owl	SM	Y	P	High	Thorough	Surveyed; Known nests protected	NO
Lewis's woodpecker	SC	Y	S	High	None	None documented	NO
Three-toed woodpecker	SC	N	A	NA	NA	None documented	NO
White-headed woodpecker	SC, BS	N	T	NA	NA	None documented	NO

SPECIES	STATUS	RANGE (Y/N)	P/A	HAB. QUAL	SURVEY LEVEL	COMMENT	PROJECT RESULT-- T&E LIST
Fisher	SC, BS	Y	U	Low	None	None documented	NO
Red tree vole	SM	N	A	N/A	Thorough	None detected; determined to be outside range	NO
Townsend's big-eared bat	SC, BS	Y	P	Low	Limited	Present in cave	NO
Oregon Shoulderband	BS, SM	Y	A	Low	Thorough	None detected	NO
Oregon Megomphix	BS, SM	Y	A	Medium	Thorough	None detected	NO
Crater Lake tightcoil	BS, SM	Y	A	Low	Thorough	None detected	NO

Status:
FE - USFW Endangered - in danger of extinction throughout a significant portion of its range
FT - USFW Threatened - likely to become endangered species within the foreseeable future
FC - USFW Candidate - proposed and being reviewed for listing as threatened or endangered
SE - State Endangered - in danger of extinction in the state of Oregon
ST - State Threatened - listed as likely to become endangered by the state of Oregon
SC - State Critical - listing is pending, or appropriate, if immediate conservation action not taken
SM - Survey & Manage - Forest plan ROD directs protection of known sites and/or survey for new sites
BS - Bureau Sensitive (BLM) - 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.

P/A Presence:
P - Present
S - Suspected
U - Uncertain
A - Absent
T - Possibly transitory

Habitat quality:
H - High
M - Medium
L - Low
A - Absent

SPECIAL STATUS WILDLIFE SPECIES–2002
HABITAT AND OCCURRENCE IN THE BUTTE FALLS RESOURCE AREA

Bald eagle (*Haliaeetus leucocephalus*)

Six nest sites are currently known within the boundaries of the Butte Falls Resource Area. Two are on private land, one on Core of Engineers land, and three are on BLM lands. 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 co-dominant trees in the stand and are usually components of old growth or older second growth forests. Prey is fish, waterfowl, small mammals (rabbits, etc.), and carrion.

Black-backed woodpecker (*Picoides arcticus*)

Presence is undetermined in the Medford BLM district. Has been documented in Cascade Mountains in Jackson County and in the Siskiyou Mountains in Josephine County. In Oregon, the black-backed woodpecker tends to occur in lower elevation forests of lodgepole pine, ponderosa pine, or mixed pine/conifer forests. Dead trees used for foraging have generally been dead three years or less.

Crater Lake tightcoil (*Pristiloma arcticum crateris*)

Species is known from south of Crater Lake, Klamath County and an occurrence in Jefferson County. Species may be found in moist conifer forests and among mosses and other vegetation near wet lands, springs, seeps and riparian areas above 2000 ft. elevation.

Fisher (*Martes pennanti pacifica*)

Habitat is mature and old growth forests. They appear to be closely associated with riparian areas in these forests. In a study done in Trinity County, California, a preference was shown for conifer forests with some hardwoods present. They seem to prefer 40-70% canopy cover. They mainly use large living trees, snags and fallen logs for denning. Have been documented in the eastern part of the Butte Falls Resource near the USFS boundary.

Flammulated owl (*Otus flammeolus*)

Habitat is a mosaic of open forests containing mature or old-growth ponderosa pine mixed with other tree species. In California, habitat included conifer and black oak. Nests mainly have been located in abandoned Northern flicker or palpated woodpecker cavities. The presence of dense conifers for roosting may be a necessary habitat components. Feeds mostly on insects. May also eat other arthropods and small vertebrates.

Great gray owl (*Strix nebulosa*)

Habitat preference is open forest or forest with adjoining deep-soil meadows. Nest in broken top trees, abandoned raptor nests, mistletoe clumps, and other platforms created by whorls of branches. Majority of nests in one study were in over-mature or remnant stands of Douglas fir and grand fir forest types on north facing slopes. Probably found in low densities across the district.

Lewis's woodpecker (*Melanerpes lewis*)

These 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.

Northern goshawk (*Accipiter gentilis*)

Goshawks use small patches of mature habitat to meet their nesting requirements within a mosaic of habitats of different age classes, including both deciduous and conifer types. While it typically does use mature forest or larger trees with high canopy for nesting habitat, it appears to be a forest habitat generalist as to the types and ages of forests used to meet life history requirements. 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*)

Old growth coniferous forest is preferred nesting, roosting and foraging habitat, or areas with some old growth characteristics with multi-layered, closed canopies with large diameter trees with an abundance of dead and down woody material. Northern spotted owls commonly nest in cavities 50 or more feet 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. NSO "core areas", 100 acres of the best habitat around activity centers for known sites (as of 1/1/94) have been designated and mapped as late successional reserves. Prey is primarily small arboreal mammals, such as flying squirrels, woodrats, voles, etc. and occasionally small birds.

Oregon megomphix (*Megomphix hemphilli*)

Expected to occur in moist conifer/hardwood forests up to 3000 ft. Found in hardwood leaf litter and decaying nonconiferous plant matter under bigleaf maple trees, especially if there are any rotten logs or stumps nearby. A bigleaf maple component in the tree canopy and an abundance of sword fern on forested slopes and terraces seems characteristic of the sites.

Oregon shoulderband (*Helminthoglypta hertleini*)

This species is known from rocky areas including talus deposits, but not necessarily restricted to these areas. 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. Somewhat adapted to somewhat xeric conditions during a part of the year.

Peregrine falcon (*Falco peregrinus*)

Primary habitat is tall cliffs. Three confirmed active sites occur in the BFRA. Occasional sightings are made during the winter months, but these are thought to be migrating individuals. 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.

Red tree vole (*Arborimus longicadus*)

An arboreal vole which lives in Douglas fir, spruce, and hemlock forests. Food consists entirely of needles of the tree in which they are living. They build a bulky nest, up to the size of a half bushel measure in the branches, usually near the trunk, 15-100 feet above the ground. The nest becomes larger with age, and may be occupied by many generations.

Three-toed woodpecker (*Picoides tridactylus*)

Presence is undetermined in the Medford BLM district. Range is along the crest of the Cascade Range and eastward. Generally found in higher elevation forests, above 4000 feet. In eastern Oregon, three-toed woodpeckers nest and forage in lodgepole pine forests. They are occasionally found roosting in hemlock and Engelmann spruce trees in mature and over mature mixed conifer forests. Bark beetle larvae are primary food source.

Townsend's big-eared bat (*Plecotus townsendii*)

Roost in mines, caves, cavities in trees, and attics of buildings. They have low tolerance to changes in temperature and humidity and removal of trees around these sites 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.

Vernal pool fairy shrimp (*Branchinecta lynchi)*

Habitat is vernal pools. They have only been found in Agate Desert and Table Rock areas.

Western pond turtle (*Clemmys marmorata marmorata*)

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 overwinter 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 snowpack, but may move up to 5-6 times in a winter in areas with little or no snow. General habitat characteristics of overwintering areas appear to be broad. There may be specific microhabitat requirements, which are poorly understood at this time.

In many areas, predation on the hatchlings and competition from bullfrogs, bass, and other exotic species is limiting population levels. Adult turtles are relatively long lived, but as the adults age, recruitment is not occurring at levels which can maintain future healthy populations.

White-headed woodpecker (*Picoides albolarvatus*)

Presence in the BFRA is undetermined. May migrate through the area. White headed woodpeckers occur in ponderosa pine and mixed ponderosa forests. 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. Area is in periphery of known range.

Sources:

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BUREAU OF LAND MANAGEMENT
Medford District Office
EVALUATION FOR T&E AND SURVEY AND MANAGE WILDLIFE SPECIES
Conformance Review

Resource Area Butte Falls Resource Area EA or Case File No. _____
Project Name Lower Big Butte Projects

THREATENED AND ENDANGERED SPECIES (underline)

1. **YES** NO Wildlife species designated by USFWS "Threatened and Endangered" are known to occur in the project area.

2. **YES** NO The project may affect T&E species.

3. **YES** **NO** Consultation with USFW has been completed and a Biological Opinion Received.
BO # 1-7-01-F-032, 12 October, 2001

SURVEY AND MANAGE (underline)

1. **YES** NO Wildlife species designated as "Survey and Manage" under the Forest Plan and Medford District Record of Decision (ROD) are known to occur in the project area.

2. **YES** NO Suitable habitat for Survey and Manage wildlife species occurs in the project area.

3. **YES** NO The project area is within the range of wildlife species designated as "Survey and Manage" or "Protection Buffer" under the Forest Plan ROD for the following:

   X Great Gray Owl ___ Red Tree Vole X Mollusk

. 4. YES **NO** Surveys for "Survey and Manage" or "Protection Buffer" wildlife species not required. List special protection stipulations below, if any.

5. **YES** NO The project may affect Survey and Manage wildlife species.

6. **YES** **NO** Surveys for Survey and Manage wildlife species have been completed. If NO, when are surveys expected to be completed?

_____

CONFORMANCE EVALUATION (check one)

1. X The project conforms with the President's Forest Plan FSEIS/EIS and Medford District RMP ROD for Standards and Guidelines relating to Protection Buffer and Survey and Manage species (survey protocols and management recommendations).

2. ___ The project does not conform with these plans, but could be modified to conform (see comments).

3. ___ The project does not conform with these plans, and could not be modified to conform (see comments).

Stipulations/project design/comments:

Red tree voles were completed in all proposed timber sale units with no detections. No mid veins or any other evidence was detected by field surveyors. Current protocol, (Version 2.0) determined the Lower Big Butte Creek area is outside the range of the red tree voles and no surveys are required.

Buffer meadows with 300 foot no commercial harvest buffer. Buffer great gray owl nest with 1/4 mile (or 125 acre) buffer.

Signed: Linda Hale (signature on file) Date: _____
Wildlife Biologist

Appendix D
03-05-02

Roads Table ALTERNATIVES II, III &V LOWER BIG BUTTE				
New Construction Roads				
Road Number	Miles	Surf Type	Control	Remarks
34 1E 18.00	0.02	NAT	PVT	(Alt 2,3) Decommission after use/Reserve RW for future use
34 1E 24.06	0.02	NAT	PVT	(Alt 2,3) Decommission after use/Reserve RW for future use
34 1E 24.07	0.02	NAT	PVT	(Alt 2,3) Decommission after use/Reserve RW for future use
34 1E 35.00A2	0.15	Surfaced	PVT	(Alt 2,3,5) Warren Easement - Surface road
34 2E 17.00	0.06	NAT	BLM	(Alt 2,3,5) Powder River Gate/Higgens Easement
35 1E 12.05	0.02	NAT	PVT	(Alt 2,3) Decommission after use/Reserve RW for future use
35 2E 20.00	0.40	NAT	PVT	(Alt 2)
35 2E 20.01	0.31	NAT	PVT	(Alt 2)
Other Roads - Renovation, Improvement, Decommission, Full Decommission				
Road Number	Miles	Surf Type	Control	Remarks
34 1E 13.01	0.25	NAT	PVT	Renovate, Temp closure (barricade)
34 1E 13.06	0.90	NAT	PVT	Renovate, Improve, Maintenance Spot Rock
34 1E 15.00 A,B,C,D1,D2	2.56	NAT	BP	Renovate, (existing BLM gate)
34 1E 15.03	0.90	NAT	BLM	Full Decommission
34 1E 15.05	0.03	NAT	BLM	Full Decommission first 150 ft.
34 1E 15.06	0.45	NAT	BLM	Improve (Maintenance Spot Rock through muddy areas)
34 1E 24.06	0.15	NAT	PVT	Renovate
34 1E 25.00 A	0.30	NAT	BLM	Full Decommission

Roads Table ALTERNATIVES II, III &V LOWER BIG BUTTE				
34 1E 25.00 C,D	0.42	NAT	BLM	Renovate/Improve (Surface), Temp closure (Barricade for segment B)
34 1E 25.01	0.32	NAT	BLM	Renovate then Full Decommission.
34 1E 26.00	1.50	ABC	PVT	Renovate
34 1E 26.01	1.23	PRR	BLM	Renovate
34 1E 26.02	0.30	PRR	PVT	Renovate
34 1E 28.00 A	0.26	ASC	PVT	Easement needed. Derby Road. Renovate (Existing PVT gate)
34 1E 28.00 B	0.20	NAT	BLM	Renovate (Old Railroad grade)
34 1E 35.00A1	0.32	ASC	PVT	Easement needed. Renovate
34 1E 35.00 B	0.66	NAT	BLM	Renovate
34 2E 2.02	0.37	NAT	BLM	Decommission
34 2E 3.01	0.05	NAT	PV	Full Decommission. Block at property line.
34 2E 7.00 A,B,C	1.41	ASC	PB	Renovate
34 2E 7.00 D1	0.21	ASC	BLM	Renovate
34 2E 7.01 A	0.49	ABC	Other	Renovate
34 2E 7.01 B	0.76	ABC	Other	Renovate (Road to rock pit)
34 2E 7.02 A,B,C,D,E,	2.62	ABC	PVT	Renovate
34 2E 7.02 F	0.20	NAT	PVT	Renovate/Improve (Maintenance Spot rock)
34 2E 8.00 A	0.33	ASC	PVT	Existing BST
34 2E 8.00 B1	0.05	ABC	PVT	Renovate
Jeep Road between 9.03 and 7.0 roads	0.25	NAT	BLM	Full Decommission. Currently connects two road systems. Not needed.
34 2E 9.00 A1,A2	1.83	ASC	BLM	Renovate
34 2E 9.01 A	0.49	ASC	BLM	Renovate
34 2E 9.01 B1	0.28	ABC	BLM	Improve (Surface)
34 2E 9.01 B2	0.50	PRR	BLM	Renovate

Roads Table ALTERNATIVES II, III &V LOWER BIG BUTTE				
34 2E 9.01 C	2.10	NAT	BLM	Renovate
34 2E 9.02	0.95	NAT	BLM	Armor Culvert Overflow
34 2E 9.07 A	0.15	PRR	BLM	Renovate /Improve (Surface) temp closure (Install gate)
34 2E 9.07 B	0.83	NAT	BLM	Renovate /Improve (Surface/ waterdips)
34 2E 10.02	0.01	NAT	PV	Decommission
34 2E 11.02	0.53	NAT	BLM	Decommission from property line, remove cmps
34 2E 13.02	0.10	NAT	BLM	Decommission
34 2E 14.01 A,B	0.48	NAT	PV	Decommission (Remove log stringer bridge)
34 2E 14.02	0.14	NAT	PV	Decommission (Install Log Barricade)
34 2E 14.03	0.44	NAT	BLM	Full Decommission
34 2E 15.03	0.28	NAT	BLM	Full Decommission
34 2E 23.01	0.18	NAT	BLM	Decommission
34 2E 26.02	0.10	NAT	BLM	Decommission (Block rd w/oversize from quarry)
34 2E 26.03 A	0.26	NAT	BLM	Full Decommission
34 2E 26.03 B	0.02	NAT	PVT	Full Decommission
34 2E 26.04A	0.12	NAT	BLM	Block on N. Section line. Decommission
34 2E 26.06	0.20	NAT	BLM	Full Decommission below quarry. Block at jct of 35-2E-2
34 2E 27.07	0.95	NAT	PVT	Renovate / Improve (Maintenance Spot rock)
34 2E 29.00 A1,A3, A4	3.07	ABC	PVT	Renovate
34 2E 29.00 A2	0.77	ABC	BP	Renovate
34 2E 29.01 A,B	1.20	ABC	PVT	Renovate (Existing gate)
34 2E 33.00 A	0.10	NAT	BLM	Renovate/Harper Easement

Roads Table ALTERNATIVES II, III &V LOWER BIG BUTTE				
35 1E 11.00	0.57	ABC	PVT	Renovate
35 1E 12.00	0.67	NAT	PVT	Renovate
35 1E 12.01 A	0.95	ABC	PVT	Renovate
35 1E 12.01 B	0.61	NAT	PVT	Renovate / Improve (Maintenance Spot rock/ waterdips,CMPs)
35 1E 12.04	0.88	NAT	PVT	Renovate
35 2E 2.00 A,B,C,D	2.85	ABC	BLM	Renovate (Road to rock pit)
35 2E 2.03 A	0.90	NAT	PVT	Renovate/Improve (Surface)
35 2E 2.03 B	1.00	NAT	BLM	Renovate/Temp closure (barricade)
35 2E 5.00	1.04	NAT	PVT	Renovate/Improve(Maintenance Spot rock)
35 2E 7.00 A	0.93	NAT	PVT	Renovate
35 2E 7.00 B	0.90	GRR	PVT	Renovate, Rehab pump chance
35 2E 10.00 A,B	1.36	NAT	PVT	Renovate/ Renovated under Ginger Springs TS
35 2E 16.00	1.06	NAT	PVT	Renovate/(Slump repair)
35 2E 16.02	0.28	NAT	PVT	Renovate/Improve (Maintenance Spot rock)
35 2E 16.07 A,B,C	0.92	NAT	PVT	Renovate/Improve (Maintenance Spot rock)
35 2E 18.00	1.80	NAT	PVT	Renovate

In addition to road closures shown above, the following roads are already barricaded or planned for barricading. A total of about 20 miles of closure is included.

33-2E-35.04
34-1E-03.01
34-2E-01.00
34-2E-01.01
34-2E-02.03
34-2E-02.07
34-2E-04.04
34-2E-05.01
34-2E-09.04
34-2E-21.01
34-2E-21.02
34-2E-24.01
34-2E-27.02
34-2E-27.04
34-2E-35.02
35-2E-18.02
35-2E-18.03
35-2E-18.04
35-2E-18.05
35-2E-18.06
35-2E-18.07

Appendix E final version 3/04/02

APPENDIX E - SILVICULTURAL PRESCRIPTION & MARKING GUIDELINES

SILVICULTURAL PRESCRIPTION - LOWER BIG BUTTE TIMBER SALES
MANAGEMENT DIRECTION AND OBJECTIVES

Management Direction

To manage timber resources on matrix lands and lands classified as withdrawn from the commercial timber allocation as provided for under the Medford District Resource Management Plan and the Record of Decision for the Northwest Forest Plan.

General Objectives

1. Manage forests of the Matrix land use allocation so that over time landscapes would trend toward a forest composed of stands containing a variety of structures, stands containing trees of varying age and size, and stands with an assortment of canopy configurations. As stands age, within stand conditions should trend toward those characteristic of older forest types. Manage to assure a moderately high to high level of sustained timber productivity.

2. Manage forests allocated as withdrawn from the commercial timber allocation to enhance forest health conditions which provide for other resources.

Treatment Objectives Specific to the Lower Big Butte Watershed

The objectives of a harvest entry in the Lower Big Butte watershed area at this time are:

1. To favor a return to the seral phase of the white fir and Douglas-fir series as a long term silvicultural approach to provide for sustainable forest conditions. Potential climatic change may alter conditions on these sites such that the future sustainable vegetation may be the more drought tolerant seral phases of the white fir and Douglas-fir series. Favored species should be the shade intolerant and intermediates, ponderosa pine, sugar pine, incense cedar, Douglas-fir and hardwood species. Of particular concern is maintaining pine species on sites within the moderate to dry end of the Douglas-fir plant association series.

2. To reduce wildfire risks for conifer stands within the rural interface by reducing ladder fuels and crown bulk densities. Desired canopy closures are between 40% to 60%.

3. To thin from below in merchantable second growth stands, to redistribute growth to vigorous dominant and co-dominant trees.

4. To reduce density levels towards the carrying capacity of the site. In selectively cut stands, remove individual trees across all diameter classes to reduce inter-tree competition while maintaining or promoting the development of multiple canopy layers.

5. To regenerate deteriorating stands and stands with Douglas-fir infected with dwarf mistletoe; and to prepare units for seedling establishment and growth by providing suitable site conditions for planting.

6. To maintain coarse woody debris, snags and large green conifers for long term site productivity and biological legacies.

7. To return areas of diminished conifer productivity to their full, long term capability.

8. To reduce stocking levels as well as conifer and brush encroachment in oak/pine woodlands to provide for increased mast production, forage palatability and reduced fire severity.

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SITE/STAND DESCRIPTION

1. General Description of the Site

The proposed sale area is located in portions of Sections, 3, 9, 10, 11, 15, 17, 25, 33 and 35 in Township 34S, Range 1E and Sections. 8, 9, 16, 17, 18, 19, 20, 21, 28, 29, 33, 34 and 35 in Township 34S, Range 2E, and Sections, 1, 3, 10, 11, 12, and 13 in Township 35S, Range 1E and Sections, 7, 9, 17, 18 and 19 in Township 35S, Range 2E.

2. Abiotic Conditions

a. Soil types - The watershed is characterized by two geologic provinces. The northeastern portion of the watershed is dominated by soils formed in colluvium from volcanic andesitic rocks. The soil series present include the Freezner, Geppert, Farva, Pinehurst, Dumont and Coyata series. These soils are generally deep (40 to 60 inches) with a fine loamy texture. The Geppert, Farva and Coyata series however are moderately deep (20 to 40 inches) and skeletal (> 35% rock fragments in the subsoil).

The soils in the southwest portion of the watershed were formed from weathered volcanic tuffs and breccia. The dominant soil series present are Medco, McNull, Carney and Coker. These soils are shallow to moderately deep and have a high amount of shrink-swell clays (> 30%). The high amount of clay in these soils greatly influences the vegetation communities that are supported.

b. Climate/Topography - The landform within this area is highly variable and ranges from very steep to gentle slopes with areas of flatter, Plateau type of landforms. Ridge formations are primarily aligned southwest to northeast and the elevational range is approximately 1800-4900 feet ASL. Annual precipitation ranges from 35"- 50". Most of the precipitation occurs in the late fall, winter and early spring as rainfall with the exception of the higher elevations where snow accumulates.

c. Potential site problems - Frost damage, drought and windthrow are the primary abiotic conditions of concern within the analysis area. Openings created by logging within plateau type of land forms have the potential for cold air inversions to result in frost damage to seedlings and saplings. Windthrow on moderately deep soils (the underlying bedrock restricts root growth) is also of concern, particularly on ridges, in saddles and in stands where the trees have a height to diameter ratios of 80 or more. High growing season temperatures and high evaporative demands are typical in the analysis area. These conditions result in a decrease in moisture availability which may result in an increased susceptibility of trees to insects, disease and competition related

mortality.

d. Site Index - The average site index on matrix lands considered for treatment is 73 for Douglas-fir. The site index range is as low as 60, on the dry lower elevation clay dominated soils, to as high as 98 where the soils are a deeper loam with higher amounts of precipitation. Site index is based upon Hann-Scrivani site index equations with a base age of 50 years. Site index is the average height of dominant trees at age 50. Height growth of dominant trees is relatively independent of stand density and therefore can be used as a measure of site productivity. Field review of withdrawn lands being considered for density reduction indicates that site indexes are typically below 65. However there are stands which have site indexes up to 90 and are listed as withdrawn not because of productivity but rather other site considerations such as surface rock.

3. Biotic Conditions

a. Plant associations - Within the proposed Lower Big Butte watershed, Douglas-fir is the dominate plant series. The white fir series is restricted to the upper elevational reaches of the analysis area. Ponderosa pine, sugar pine, incense cedar, Pacific madrone and Douglas-fir represent the early seral component of these series. Douglas-fir generally dominates the overstory of most stands with sugar pine and ponderosa pine and incense cedar occurring on a scattered basis. Ponderosa pine and white oak plant series are common on lower elevation and shallow soil sites. Oaks and/or pine generally dominate the overstory with varying levels of Douglas-fir on more moist pine sites. White oak, ponderosa pine are early seral tree species. Increasing levels of Douglas-fir and ponderosa pine develop in the understory in more developed stands.

The majority of the plant communities within the northeast portion of the analysis area and/or above 3000 feet elevation are at the moderate to moist end of the environmental gradient for the Douglas-fir series with some sites grading into the white fir series. Within the southwestern portion of the analysis area and at elevations below 2500 feet, plant communities tend toward the moderate to dry end of the Douglas-fir series. Much drier Ponderosa pine and white oak communities are common as well. These plant communities are found on drier aspects and where soil depth is reduced. The highly intermixed nature of the drier plant communities serves to fragment the vegetation types across the landscape. Dry site indicators such as white oak and poison oak are common understory species. Pacific madrone is common throughout the analysis area and often competes with developing conifers where openings have been created. Douglas-fir and incense cedar are the primary conifer species regenerating within un-managed conifer stands.

b. Stand history - Historically, fire was the primary large scale natural disturbance event. Within the analysis area, the majority of timber stands commonly experience high temperatures, moderate precipitation and low fuel moisture in the summer. Historically, this provided conditions conducive to frequent fire occurrence with variable levels of severity. Frequent fire often provided for a low thinning effect and retention of seral fire resistant species such as ponderosa pine, sugar pine and incense cedar. Intense stand replacement fires have occurred occasionally in lower elevations and are evidenced by the development of stands dominated by

madrone or evenaged Douglas-fir with little to no variation in structure. Moderate to high severity fires were more infrequent in occurrence and would typically occur on northern aspects and higher elevations (above 3500 feet) where higher productivity levels, relatively cooler summertime temperatures and higher levels of moisture would work in combination to provide for a longer fire return interval.

During the past century, logging has replaced fire as the primary event that has shaped stand condition and structure.

c. Structure Description - The structural characteristics of the stands within the proposed treatment areas vary from single canopy even-aged stands to multi-canopy stands. Multi canopy stand conditions are the norm where stands are mature (150 years or greater). In general, two storied and multi-storied stands have understories which are suppressed and usually dominated by Douglas-fir or incense cedar. In most stands widely scattered 40"-50"+ Douglas-fir, sugar pine, ponderosa pine, and incense cedar trees are also present as fire remnants of previous stands.

d. Insect, Disease, Pocket Gophers and High Stand Densities
Root pathogens are not a widespread problem but do occur in the area. Infection centers of root pathogens such as *Phellinus weirri*, *Phomes Annosus,* and *Armillaria spp*. are present. Small pockets of white fir and Douglas-fir are affected.

Douglas-fir mistletoe and white fir mistletoe is present and affecting tree vigor in some of the stands. Throughout the majority of the analysis area however it occurs at low levels and is primarily a concern with respect to future stand development considerations. Lightly infected mature stands with an understory of host species have the greatest potential for severe mistletoe infection and spread. 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. Removal of infected trees, thinning to favor non-host species and/or regeneration of non-host species will minimize the potential for increased levels of mistletoe infection.

Pocket gopher populations are generally low within the proposed analysis area and are dependant upon the availability of herbaceous food sources. The greatest potential for high pocket gopher populations is where the greatest amount of herbaceous food source is available. Regeneration harvest of upper elevation stands on the moist end of the Douglas-fir series are the most likely to provide suitable food sources following disturbance. Creation of favorable gopher habitat in these sites will be discouraged by maintaining some canopy cover and limiting soil disturbance. Site preparation will be a combination of lopping and scattering, slashing and hand piling, excavator piling, and burning of piles. These methods will minimize the re-initiation of early seral herbaceous vegetation.

Stand densities are currently very high, >60%RD. High densities is the most critical factor currently affecting stand vigor and development within the analysis area. Inter-tree competition for limited site resources has resulted in declining tree vigor and growth, tree mortality and an increased susceptibility of trees to insect attack, disease infection, and fire intensity. Low

elevation drier sites, which historically were thinned by fire, are in the most critical condition with respect to stand densities and/or forest health. These sites are marginal for timber productivity and many are classified as withdrawn from the timber production base. Because of poor access, lower economic values and fire suppression, these sites have been allowed to increase in stocking uninterrupted. The result is stagnated stands in which Douglas-fir or suppressed incense cedar is becoming the dominant species. The structure of the vegetation is also such that low thinning effect wildfire regimes are shifting to where stand replacement fires will become the norm. These dry sites can be difficult to reforest yet serve as important forested cover to more open adjacent oak woodlands and non forested lands. Maintenance of species diversity is important on these sites to ensure resilience and stability to drought, fire or insect and disease infestation.

e. Coarse woody debris (CWD) - Transects were completed within the treatment areas considered for regeneration harvest. The amount and decay classes of woody debris reflects the stage of stand development. In a natural cycle, two stages of stand development typically have the greatest amounts of CWD. Those stages are, stand initiation following a stand replacement event and as the old growth phase.

The objectives within the treatment area are: 1). In the younger stands maintain existing levels as they currently are. 2). In stands proposed for regeneration harvest to create or maintain 120 linear feet of logs per acre greater than or equal to 16 inches in diameter and 16 feet long, decay class 1&2.

f. Snags - The kind and amount of snags varies depending on the stage of stand development. Under natural processes, early and old growth stands typically have the greatest amounts of stage 1&2 snags. In late seral stands, the snag component is usually variable with the majority in stages 3, 4 & 5. The objective of this prescription is to retain all stage 1&2 snags for wildlife and future coarse woody debris. The only instances where stage 1 snags may be removed in areas are when they are a safety hazard or where individual trees were designated for removal in the marking process and have died in the interim. In regeneration harvest stands, the target level of snags is 1.8 snags per acre.

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.

1). Target Stand - Selective Cut (SC)

Stands: T34S 1E, 15-01, 25-01,.
T34S 2E, 19-04, 28-01,
T35S 1E, 01-02.

Immediately following the harvest entry, these stands are composed of the most vigorous trees of all species and diameter classes. Large healthy ponderosa pine and sugar pine have been released to insure their continued presence in the stand. Species composition is dominated by Douglas-fir, followed by smaller amounts of ponderosa pine, sugar pine and incense cedar. All hardwoods greater than 14 inches in diameter have been left. Vertical and biological diversity is present through the retention of healthy trees of all age and size classes. Basal area has been regulated to reduce density levels towards the carrying capacity of the site. Growth rates and individual tree vigor has been increased due to the greater availability of moisture and nutrients for the residual trees. Planting of Douglas-fir has occurred in openings created from removal of low vigor trees or where the brush component has been excavator piled. Basal area is approximately 100-140 sq. ft. with average canopy closure approximately 40% or greater. Coarse woody debris (CWD) is present and provides 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 CWD and snags will be available.

YEAR	SELECTIVE CUT TREATMENT
0 0-1 10-20	* Initial harvest - reduce stand densities by marking trees across all diameter classes up to, but not including, 50" d.b.h.. Tree vigor is the primary factor in determining the trees to remove. Trees in excess of 50" d.b.h. may **only** be removed if they are heavily infected with mistletoe (mistletoe rating >4) **and** threaten the health of the surrounding stand. Trees in excess of 50" d.b.h. may also be removed within specific units (referenced within the marking guides) if those trees exhibit deteriorating crown and tree conditions and their removal provides for attaining overall stand objectives such as release of existing pine species. In general trees greater than 30" d.b.h. should also be favored for retention to maintain a later seral structure. Trees 30"-50 inches however can be considered for removal to meet overall stand objectives. * Use widely spaced designated skidtrails or corridors, directional falling and log length skidding to reduce site impacts. * Treat logging slash and where necessary existing brush and hardwoods. Methods may include: slashing brush and hardwoods and hand piling and burning or lopping and scattering heavy slash concentrations, refer to the attached stand treatment recommendations. * Slash all hardwoods regardless of condition and all sprung or severely damaged conifers between 1&7". Provide for thinning of remaining conifers between 1 and 7 inches D.B.H. as follows: conifers retained should have a 30% live crown ratio or greater. Leave trees should be the larger and more vigorous individuals with the following order of species preference (sugar pine, ponderosa pine, Douglas-fir, incense cedar, true fir). Space trees 14 to 16 feet apart on average allowing for up to 30% variation in spacing between individual trees to provide for selection of more desirable trees. Where residual damage is high and/or trees do not meet vigor requirements slashing of all except vigorous individuals will occur. Spacing requirements only apply to areas where an adequate number of "acceptable" trees exist. * Plant Douglas-fir and ponderosa pine and sugar pine in created openings. * Where necessary, seedlings and saplings in the understory have been thinned and released from brush competition. * Conduct stand exam to assess stand conditions and to determine if any additional management treatments are needed.

Selective Cut (SC) - Silvicultural Options Considered:
The silvicultural prescription process considered other harvest methods as well as no action.

Existing stand condition: In the stands recommended for selective cut, an adequate mix of species are present to promote long-term resistance to damaging agents, (insect & disease associated with any one specific species). In addition, an adequate number of overstory and

understory trees have good crown ratios and vigor to provide for site occupancy following a harvest treatment; These stands are typically overstocked however and many trees are showing symptoms of decline (poor crown ratios, chlorotic thinning foliage and in cases the presence of mistletoe, stem decay etc;). As stands age, moisture stress problems and consequent mortality increase for the following reasons: 1). Decreased water conductance and other physiological problems increase with tree size and age making older trees more susceptible to drought and other stress factors (insects and disease). 2). The amount of photosynthate required to meet the respiratory requirements of a tree increases with tree size, making less of the energy available for growth or to withstand stress. The energy required to maintain the life of trees or of stands increases rapidly with air temperature and with tree size. 3). As shade tolerant tree species invade the understories of stands, competition for site resources (moisture and nutrients) increases, leading to the mortality of overstory trees because their respiratory requirements can not be met.

Based upon the existing stand conditions a regeneration harvest is not recommended for these stands. With healthy overstory trees, a mixed species condition and variable amounts of understory trees a healthy stand can remain following entry. Stand densities will also be reduced, freeing up site resources (water & nutrients) for the remaining trees. The post harvest stand would be more vigorous and resilient to environmental stresses (drought, insects, disease, climate change).

No action is not recommended based on current stand densities, the potential for tree species simplification and a likely increase in insect, disease and wildfire risk. With treatment deferral stand densities will remain high. Mortality of overstory trees and competition will promote development of an understory dominated by low vigor Douglas-fir, white fir (on moist sites) and incense cedar. Ponderosa pine, sugar pine and larger hardwoods will decline as a stand component due to overstory shading and inter-tree competition. The overall result is species simplification as the mixed conifer overstory fades out and understory competition favors shade tolerant species. The resulting stand will be prone to high levels of mortality from insect, disease and competition due to poor vigor & species simplification. With poor individual tree growth, increased mortality and dense stocking, these stands will become more susceptible to loss from wildfire. Treatment however will provide a stand condition which maintains species diversity, enhanced diameter growth of understory components and reduced available fuel loadings (lower mortality rates and reduced vertical and horizontal continuity of crowns).

2). Target Stand - Regeneration Harvest (RH)

Modified Even-aged - 6-8 trees/acres > 20" d.b.h.
Stands: T34S R2E, 33-03

Approximately 6-8 green conifers/acre, greater than 20" d.b.h. remain following entry. Healthy Douglas-fir, ponderosa pine, white fir, incense cedar and sugar pine will be favored to leave as the overstory trees greater than 20" d.b.h. At least three hardwoods/acre greater than 12" d.b.h. would be retained where possible. Additionally, all exceptionally vigorous ponderosa pine, Douglas-fir, incense cedar, and sugar pine regardless of size would be left unless thinning of

pockets is appropriate. Basal area immediately following entry would be approximately 20 to 40 square feet/acre, with an estimated canopy closure of 15% to 40%. In addition to stage 3,4 & 5 snags a minimum of 1.8/acre stage 1&2 snags are present. All decay classes of coarse woody debris are present (either standing or down) with a minimum of 120 linear feet of decay class 1&2. Site preparation has included shrub control and slash treatment by excavator piling from designated skidtrails or slashing of brush and hardwoods and hand piling and burning. Skidtrails have been ripped. The unit has been planted with a mix of conifer species. Species diversity is present with Douglas-fir, ponderosa pine, sugar pine, and incense cedar. Stand density would be periodically regulated by precommercial thinning and commercial thinning entries. Approaching age 100, this stand is a fully stocked stand of healthy, vigorous dominant and co-dominant second growth trees with scattered large remnants. Stocking would be approximately 35% relative density (185 SDI).

REGENERATION HARVEST	
YEAR	TREATMENT

0	* Harvest - Leave 6-8 conifer trees/acre, >20"d.b.h. and all vigorous ponderosa pine, Douglas-fir, incense cedar, sugar pine and hardwoods 8-20" d.b.h. * A minimum of 1.8 snags/acre (stage 1&2) and 120 linear feet coarse woody debris (decay class 1&2, 16" X 16') would be left. * Use widely spaced designated skidtrails, directional falling and log length skidding to reduce site impacts. * Site preparation: Slash trees damaged from logging activities, 1-6". Leave all other healthy unmerchantable trees. Brush and hardwoods are to be treated either by excavator removal or slashing. Excavator or handpile brush and slash and burn. Limit piling of logging slash to pieces < 16" diameter. * Rip skidtrails
0-1	* Plant with a mix of ponderosa pine, Douglas-fir, sugar pine and incense cedar. Apply appropriate maintenance (vexar tubing, mulching, shading, scalping, baiting) treatments to insure planting success.
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 will have a minimum a 280 well spaced trees per acre. Competing vegetation will have been controlled, with trees growing rapidly.
10	* Precommercial thin the understory if more than 400 trees per acre are present.
35	* Average diameter at breast height is 10", commercial thin if stand density is appropriate, otherwise delay until crown closure and competition reduces growth rates.
45-80	* Commercial thin if appropriate, consider underburning to provide nutrient "pulse" and for regulating understory seedling and sapling component.
100+	* Assess stand and watershed conditions for possible regeneration harvest.

Regeneration Harvest (Structural Retention, Modified Even-aged, and Shelterwood Retention) - Silvicultural Options Considered:

Existing Conditions: The overstory in this stand exhibits declining characteristics, such as, poor crown conditions, low crown ratios, poor growth rates, mistletoe infestation and moderate to high levels of stem decay. The understory is predominantly scattered or clumped small white fir Douglas-fir and incense cedar at 1-6" in diameter. Understory trees less than 4 inches d.b.h. are

overtopped by brush and typically have less than 30% live crown and exhibit an average annual height growth of less than 6 inches. Mid-story trees are generally vigorous but represent less than 10% of the total stocking.

Uneven-aged Regeneration Options:
Neither individual tree selection nor group selection are desirable due to the structure, vigor and species composition of the existing stands. These types of methods would further encourage the establishment and growth of undesirable white fir and an increase in mistletoe infection.

Intermediate Treatment Options:
Commercial thinning is not appropriate due to the advanced age, structure, poor vigor and current stand density within the units.

No Action
No action will result in continued loss of the existing overstory with little change to the existing understory which is dominated by brush species. Overstory mortality will continue and through time conifer regeneration will slowly occupy the site (20 to 40 years). With this, understory trees will be highly susceptible to stem decays, mistletoe, and stress related mortality due to existing suppression from the brush component and inoculation of mistletoe from the existing overstory. Allowed to continue into the long term (50 years+) snag levels, down wood and structural complexity will increase. Compared to a managed stand where brush is cleared and conifers are planted, re-establishment of a mature conifer stand will be delayed to 100-120 years versus 80 years with management.

4). Target Stand - Density Management (DM)

Matrix Lands

Township-Range	Unit ID		Township-Range	Unit ID		Township-Range	Unit ID
34S-01E	9-1		34S-02E	18-1		35S-01E	3-5
34S-01E	9-4		34S-02E	18-2		35S-01E	10-1
34S-01E	25-3		34S-02E	19-1		35S-01E	10-2
34S-01E	25-5		34S-02E	29-1		35S-01E	11-1
34S-01E	35-2		34S-02E	33-4		35S-01E	11-2
34S-01E	35-3		34S-02E	34-1		35S-01E	11-4
34S-02E	9-1		34S-02E	34-2		35S-01E	12-1
34S-02E	16-1		34S-02E	34-3		35S-02E	7-4
34S-02E	16-2		35S-01E	1-1		35S-02E	17-3
34S-02E	16-3		35S-01E	1-3		35S-02E	18-4
34S-02E	16-4		35S-01E	3-3		35S-02E	19-6
34S-02E	17-1		35S-01E	3-4			

Immediately following the harvest, these stands will have density levels that are near the carrying capacity of the site. Species composition is well represented with Douglas-fir, ponderosa pine, sugar pine, incense cedar and white fir. Hardwood species occur as an occasional stand component either singly (California black oak) or in clumps (madrone). Trees sizes may include vigorous seedlings, saplings, small conifers and , where available, healthy large conifer trees. Overall stocking however will trend towards the dominant overstory size class for a given stand. The residual merchantable trees (>8" d.b.h.) are characterized by co-dominant or dominant attributes, such as, crown ratios greater than 35%, good growth rates and larger diameters. The mosaic of size classes provides the structural diversity. Late seral stands (11"-21" d.b.h.) will possess late successional characteristics with growth accelerated. Crown closure will be approximately 40% or greater, with basal area ranging from 110-180 sq.ft.

Withdrawn Lands*****

Township-Range	Unit ID
34S-02E	28-4
34S-02E	34-1W
35S-01E	3-2

In withdrawn stands, thinning from below will occur to the point where approximately a 60% residual canopy closure is provided. Similar attributes described for matrix lands will be provided. Somewhat higher levels of stocking and retention of lower vigor individuals will result by maintaining a 60% canopy closure. Residual basal areas will be dependant upon existing size classes but vary from 120- 250 sq. ft.

The amount of coarse woody debris (CWD) for all stands will be dependant upon the current levels, availability of overstory snags, and residual green trees. Stage 1 and 2 snags will remain for wildlife. Large fire remnant trees generally >200 years and >40-50" d.b.h. will be retained as a scattered stand component.

YEAR	TREATMENT
0	* Initial harvest - thin from below, favor seral species, utilize relative density of 35%, 40% or 45%. Utilize a canopy closure of 60% for withdrawn lands. * Use widely spaced designated skidtrails, directional falling and log length skidding to reduce site impacts. * Slash all excess, sprung or severely damaged conifers and hardwoods between 1&6" * Pile and burn or lop and scatter heavy slash concentrations.
10-20	* Conduct stand exam to assess stand conditions and to determine if any additional management treatments are needed.

5). Target Stand - Understory Thinning

Township-range	Section	OI Unit #		Township-range	Section	OI Unit #
34S-01E	3	4		34S-01E	35	1
34S-01E	9	2.1		34S-01E	35	3
34S-01E	9	3		34S-02E	16	3.1
34S-01E	9	4		34S-02E	16	4.1
34S-01E	9	6		34S-02E	16	6.1
34S-01E	9	7		34S-02E	17	6.1
34S-01E	9	9		34S-02E	17	7.1
34S-01E	9	11		34S-02E	19	2.1
34S-01E	9	13		34S-02E	20	2.1
34S-01E	10	1		34S-02E	21	2.1
34S-01E	10	3.1		34S-02E	21	2.2
34S-01E	10	3.2		34S-02E	21	5.1
34S-01E	10	4.1		34S-02E	21	7.1
34S-01E	10	4.2		34S-02E	28	1.1
34S-01E	10	6.1		34S-02E	28	3.1
34S-01E	10	7		34S-02E	28	5.1
34S-01E	10	8		34S-02E	28	8.1
34S-01E	10	9		34S-02E	28	8.2
34S-01E	10	10		34S-02E	28	8.3
34S-01E	10	11		34S-02E	28	9.1
34S-01E	11	1		34S-02E	29	5.1

34S-01E	11	5		34S-02E	29	5.2
34S-01E	11	6		34S-02E	34	34-4
34S-01E	14	1		34S-02E	34	6.1
34S-01E	15	3.1		34S-02E	34	6.2
34S-01E	15	3.2		34S-02E	34	7.1
34S-01E	15	4		34S-02E	35	18.1
34S-01E	15	5		35S-01E	3	5
34S-01E	15	6		35S-01E	3	994.2
34S-01E	15	20		35S-01E	11	1
34S-01E	17	1		35S-02E	18	4
34S-01E	21	1		35S-02E	18	10
34S-01E	33	4				

Immediately following the treatment, thinned early and mid seral stands (0-11 inches d.b.h.) will have density levels that are near the carrying capacity of the site. Residual trees will be pruned to 8 feet in order to increase crown base heights. Species composition is well represented with Douglas-fir, ponderosa pine, sugar pine, incense cedar. Hardwood species occur as an occasional stand component either singly (California black oak) or in clumps (madrone). Trees sizes may include vigorous seedlings, saplings, small conifers and , where available, large conifer trees. Overall stocking, however, will trend towards the dominant overstory size class for a given stand. Merchantable trees (>8" d.b.h.) Will have been retained except in site specific circumstances where removal will have released larger vigorous pine or hardwood species. Residual trees (<8" d.b.h.) Will trend towards co-dominant or dominant attributes, such as, crown ratios greater than 35%, good growth rates and larger diameters. Residual basal areas will be dependant upon existing size classes but vary from 40-120 sq. ft.. Canopy closures will vary from 40-60%.

Understory thinning in more developed stands (>11' d.b.h.) will have trees 8 inches and less in diameter removed to increase crown base height and reduce crown bulk densities. On administratively withdrawn lands, stocking of overstory trees (>8" d.b.h.) will be relatively unchanged with only individual trees or isolated pockets removed to release larger vigorous pine or hardwood species. On matrix lands, trees greater than 8 inches d.b.h. may be removed where there is opportunity to utilize the material and harvest is appropriate for stocking and growth objectives. Crown closure will be approximately 60% or greater. Residual basal areas will be dependant upon existing size classes but vary from 120-250 sq. ft..

The amount of coarse woody debris (CWD) for all stands will be dependant upon the current levels, availability of overstory snags, and residual green trees. Stage 1 and 2 snags will remain for wildlife. Large fire remnant trees generally >200 years and >40-50" d.b.h. will be retained as a scattered stand component.

YEAR	TREATMENT

0	* Initial harvest - thin from below removing 8" d.b.h. or smaller trees. Favor seral species, utilize a canopy closure of 60% where possible in late seral stands. Utilize a relative density of 35%, 40% or 45% in early to mid seral stands.
0-1	* Pile and burn or lop and scatter heavy slash concentrations.
10-20	* Conduct stand exam to assess stand conditions and to determine if any additional management treatments are needed.

2). Target Stand - Underburning Conifer Stands

Township-range	Section	OI Unit #
34S-01E	3	1
34S-01E	3	2
34S-01E	3	3
34S-01E	9	8.1
34S-01E	11	3
34S-02E	8	4
34S-02E	8	5
35S-01E	3	6
35S-02E	19	19-5

Immediately following treatment, these stands will have a more prevalent single story structure. Mid-story and understory conifer components as well as brush will have been reduced from slashing or burning to adequately prevent movement of a ground fire into the overstory crowns. Stocking of overstory trees will be relatively unchanged with only individual trees or isolated pockets of recent dead overstory resulting. Canopy closures will average 60% or greater but reduction in the lower canopy levels will provide for an increase in crown base height along with a reduction in crown bulk density and surface fuel loadings. Maintenance treatments will occur as these stands mature and begin to develop more complex structures. Conifer stands in withdrawn lands would be retreated in 10 years to maintain stocking levels and ladder fuel development in a manner consistent with development of mature seral structures. Depending on conditions, stands on matrix lands would be thinned or regenerated in 10 to 20 years to optimize future growth potentials. The amount of coarse woody debris (CWD) will be dependant upon the current levels, availability of overstory snags, and residual green trees. Stage 1 and 2 snags will remain for wildlife.

UNDERBURN	
YEAR	TREATMENT

0	* Slash understory conifers less than 6 inches in diameter as needed to reduce ladder fuels and provide for adequate surface fuels ammendable for carrying fire during cooler season burning conditions.
0-1	* Underburn to provide for fuel reduction objectives.
10	* Examine stands to identify followup treatment needs

2). Target Stand - Oak/Pine Woodlands

Township-range	Section	OI Unit #		Township-range	Section	OI Unit #
34S-01E	3	6		34S-01E	35	4.4
34S-01E	9	2.1a		34S-01E	35	6
34S-01E	9	2.1b		34S-02E	16	9.1
34S-01E	9	2.2		34S-02E	16	10.1
34S-01E	9	2.3		34S-02E	17	5.1
34S-01E	9	5		34S-02E	17	5.2
34S-01E	9	5.1		34S-02E	19	1.1
34S-01E	9	5.2		34S-02E	19	1.2
34S-01E	10	1.1		34S-02E	20	3.1
34S-01E	10	5		34S-02E	28	2.1
34S-01E	11	4.1		34S-02E	29	6.1
34S-01E	11	4.2		34S-02E	29	6.2
34S-01E	15	4.1		34S-02E	34	5.1
34S-01E	15	17		35S-01E	1	7
34S-01E	15	19		35S-01E	3	1
34S-01E	17	2		35S-01E	3	7.1
34S-01E	17	3		35S-01E	3	7.2
34S-01E	21	2		35S-01E	3	7.3
34S-01E	33	5		35S-01E	3	7.4
34S-01E	35	4.1		35S-01E	3	994.1
34S-01E	35	4.2		35S-02E	7	4
34S-01E	35	4.3				

Immediately following treatment, these stands will have density levels reduced. Understory brush and conifers will have been removed to reduce ladder fuels and provide growing space for younger more succulent and/or more preferred browse species. Hardwood trees less than 12" d.b.h. will have been cut back to 1 main stem and conifers less than 8" d.b.h. will have been thinned to release larger more vigorous individual hardwoods or conifers. Pruning of conifers will occur to increase crown base heights. Species composition is dominated by hardwoods (typically white oak) but representation California black oak, madrone and conifer species will be retained where it is present. Larger trees (>3" d.b.h.) Will be spaced such that there is one half a crown width between crowns. Residual canopy closures will be provided at 60% where existing stocking is adequate. Maintenance treatments will occur as these stands mature and

begin to develop more complex structures.

Oak/pine Woodland Management

YEAR	TREATMENT
0	* Slash and/or burn understory conifers, and brush less than 8 inches in diameter and cut or girdle excess hardwoods less than 12" d.b.h., utilize ½ crown width between spacing between residual trees.
0-1	* Pile and burn or underburn to provide for fuel reduction objectives.
10	* Examine stands to identify followup treatment needs

POTENTIAL FOR "AVOIDANCE" VEGETATION MANAGEMENT STRATEGIES:

The objectives of vegetative management are:
- to improve early soil moisture conditions by eliminating or reducing the transpirational demands of competing brush and herbaceous vegetation.
- to improve survival by manipulating the distribution, density and composition of competing vegetation.
- to create access for tree planting and subsequent silvicultural treatments.
- to increase site productivity and tree growth leading to a reduction in rotation length.
- to reduce the risk of wildfire by reducing crown bulk density, surface fuels and increasing crown base heights.

With these objectives in mind, possible avoidance or prevention strategies are formulated. Under these strategies, control of vegetation relies in total or in part on habitat modifications or the complementing of natural ecosystems and processes. Method considered fall under three categories:
1. Manipulation of cutting methods -- partial cutting methods which retain sufficient canopy to reduce/prevent understory shrub growth yet still provide conditions suitable for tree growth or regeneration (natural or artificial).
2. Intensive methods -- fire, mechanical (cat piling/excavator piling/scarification/ripping), handtools (brushing).
3. Combinations of 1 & 2.

For the Lower Big Butte watershed timber sale, vegetation control is tied to the cutting method and the retention of sufficient canopy to preclude the establishment if excessive amounts of competing shrubs. Within the regeneration harvests excavator and hand piling of brush greater than 1 inch in diameter would occur.

MONITORING

Implementation of the standard and guidelines in the Record of Decision (ROD) and management direction contained within the Medford District Resource Management Plan and Final Environmental Impact Statement (RMP/FEIS) require a monitoring system to insure effective on-the-ground results. The ROD states the following: "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 will follow the outline in the Medford District RMP/EIS, Volume II, Appendices 147-163. Monitoring will be specific to the land allocations and resources affected in the Lower Big Butte Watershed treatment areas.

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 commercial harvest areas. 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 data. Information collected included:
- tree growth
- presence of insects or disease
- stand structure (tree height, diameter, crown ratio)
- species composition for all vegetation (trees, shrubs, herbaceous vegetation).
- coarse woody debris (diameters, length, decay class)
- canopy closure
- aspect, percent slope and topographic position
- snags (diameter, height and decay class)
- shrub and herbaceous vegetation (species, percent cover, location by slope and aspect)
- site index tree to determine site class/potential.

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 and a detailed assessment of stand conditions and health.

Post harvest monitoring can then be implemented, using the pre-harvest stand information to determine if the objectives have been met.

STAND TREATMENT RECOMMENDATIONS - LOWER BIG BUTTE (Alternative 3)

CONIFER STANDS

Township-Range	Sec-tion	Unit#	Acres	Presciption	Logging System	Land Allocation
34S-01E	3	1	7	Underburn		Matrix
34S-01E	3	2	9	Underburn		Matrix
34S-01E	3	3	9	Underburn		Matrix
34S-01E	3	4	61	DM-slash bus ter		Withdra wn
34S-01E	9	11	9	Understory Thin		Matrix
34S-01E	9	13	22	Understory Thin		Matrix
34S-01E	9	2.1	13	Understory Thin		Withdra wn
34S-01E	9	3	4	Understory Thin		Matrix
34S-01E	9	4	10	Understory Thin		Matrix
34S-01E	9	6	43	Understory Thin		Matrix
34S-01E	9	7	22	Understory Thin		Matrix
34S-01E	9	8.1	17	Underburn		Matrix
34S-01E	9	9	33	Understory Thin		Withdra wn
34S-01E	9	9-1	3	DM	Tractor	Matrix
34S-01E	9	9-4	12	DM	Tractor	Matrix
34S-01E	10	10	4	Understory Thin		Matrix
34S-01E	10	11	3	Understory Thin		Matrix
34S-01E	10	3.1	17	DM-slash bus ter		Withdra wn
34S-01E	10	3.2	12	Understory Thin		Withdra wn
34S-01E	10	4	12	Understory Thin		Matrix
34S-01E	10	6.1	13	Understory Thin		Withdra wn
34S-01E	10	7	1	Understory Thin		Matrix
34S-01E	10	8	23	Understory Thin		Matrix
34S-01E	10	9	2	Understory Thin		Matrix
34S-01E	11	1	5	Understory Thin		Matrix
34S-01E	11	1	8	Understory Thin	ATV	Matrix
34S-01E	11	3	30	Underburn		Withdra wn
34S-01E	11	5	14	Understory Thin		Matrix
34S-01E	11	6	3	Understory Thin	ATV	Matrix
34S-01E	11	6	14	Understory Thin		Matrix
34S-01E	14	1	1	Understory Thin		Matrix
34S-01E	15	1	8	Understory Thin		Matrix

Township-Range	Sec-tion	Unit#	Acres	Presciption	Logging System	Land Allocation
34S-01E	15	15-1	10	Select Cut	Cable	Matrix
34S-01E	15	20	12	Understory Thin		Matrix
34S-01E	15	3.1	16	Understory Thin		Withdrawn
34S-01E	15	3.2	15	Understory Thin		Withdrawn
34S-01E	15	4.2	2	Understory Thin		Withdrawn
34S-01E	15	4.3	3	Understory Thin		Withdrawn
34S-01E	15	5	32	Understory Thin		Withdrawn
34S-01E	15	6	13	DM-slash buster		Withdrawn
34S-01E	17	1	29	Understory Thin		Withdrawn
34S-01E	17	1.1	43	slash/handpile/burn		Withdrawn
34S-01E	21	1	24	Understory Thin		Withdrawn
34S-01E	25	25-1	11	Select Cut	Tractor	Matrix
34S-01E	25	25-3	28	DM	Tractor/Cable	Matrix
34S-01E	25	25-5	33	DM	Tractor	Matrix
34S-01E	33	4	10	Understory Thin	ATV	Matrix
34S-01E	35	1	14	Understory Thin		Matrix
34S-01E	35	3	12	Understory Thin		Matrix
34S-01E	35	35-2	10	DM	Heli	Matrix
34S-01E	35	35-3	17	DM	Heli	Matrix
34S-02E	8	4	2	Underburn		Matrix
34S-02E	8	5	18	Underburn		Withdrawn
34S-02E	9	9-1	15	DM	Tractor	Matrix
34S-02E	16	16-1	104	DM	Tractor/Heli	Matrix
34S-02E	16	16-2	10	DM	Cable	Matrix
34S-02E	16	16-3	9	DM	Cable	Matrix
34S-02E	16	16-4	26	DM	Tractor	Matrix
34S-02E	16	3.1	11	Understory Thin		Matrix
34S-02E	16	4.1	18	Understory Thin		Matrix
34S-02E	16	6.1	86	Understory Thin		Matrix
34S-02E	17	17-1	33	DM	Tractor	Matrix
34S-02E	17	6.1	24	Understory Thin		Withdrawn
34S-02E	17	7.1	6	Understory Thin		Withdrawn
34S-02E	18	18-1	8	DM	Tractor	Matrix
34S-02E	18	18-2	18	DM	Heli	Matrix

Township-Range	Sec-tion	Unit#	Acres	Presciption	Logging System	Land Allocation
34S-02E	19	19-1	18	DM	Heli	Matrix
34S-02E	19	19-4	44	Select Cut	Tractor	Matrix
34S-02E	19	2.1	28	DM-slash buster		Withdrawn
34S-02E	19	2.2	10	slash/handpile/burn		Withdrawn
34S-02E	20	2.1	11	Understory Thin		Matrix
34S-02E	21	2.1	21	Understory Thin		Withdrawn
34S-02E	21	2.2	54	Understory Thin		Withdrawn
34S-02E	21	5.1	5	Understory Thin		Matrix
34S-02E	21	7.1	8	Understory Thin		Withdrawn
34S-02E	28	1.1	11	Understory Thin		Matrix
34S-02E	28	28-1	55	Select Cut	Heli	Matrix
34S-02E	28	28-4	12	DM	Heli	Withdrawn
34S-02E	28	3.1	14	Understory Thin		Matrix
34S-02E	28	5.1	14	Understory Thin		Withdrawn
34S-02E	28	5.2	11	slash/handpile/burn		Withdrawn
34S-02E	28	8.1	39	Understory Thin		Withdrawn
34S-02E	28	8.2	14	Understory Thin		Withdrawn
34S-02E	28	8.3	16	Understory Thin		Withdrawn
34S-02E	28	9.1	21	Understory Thin		Matrix
34S-02E	29	29-1	46	DM	Tractor	Matrix
34S-02E	29	5.1	16	Understory Thin	ATV	Withdrawn
34S-02E	29	5.2	6	Understory Thin	ATV	Withdrawn
34S-02E	33	33-3	27	NGFMA_Regen	Tractor	Matrix
34S-02E	33	33-4	10	DM	Tractor	Matrix
34S-02E	34	34-1	56	DM	Heli	Matrix
34S-02E	34	34-1W	7	DM	Heli	Withdrawn
34S-02E	34	34-2	9	DM	Heli	Matrix
34S-02E	34	34-3	13	DM	Heli	Matrix
34S-02E	34	34-4	13	Understory Thin		Matrix
34S-02E	34	6.1	11	Understory Thin		Withdrawn
34S-02E	34	6.2	20	DM-slash buster		Withdrawn

Township-Range	Sec-tion	Unit#	Acres	Presciption	Logging System	Land Allocation
34S-02E	34	7.1	20	Understory Thin		Withdrawn
34S-02E	35	18.1	18	Understory Thin		Matrix
35S-01E	1	1-1	15	DM	Heli	Matrix
35S-01E	1	1-2	20	Select Cut	Heli	Matrix
35S-01E	1	1-3	46	DM	Heli	Matrix
35S-01E	3	3-2	11	DM	Heli	Withdrawn
35S-01E	3	3-3	14	DM	Tractor/Cable	Matrix
35S-01E	3	3-4	12	DM	Heli	Matrix
35S-01E	3	3-5	7	DM	Heli	Matrix
35S-01E	3	5	7	Understory Thin		Matrix
35S-01E	10	10-2	9	DM	Heli	Matrix
35S-01E	11	1	15	Understory Thin		Matrix
35S-01E	3	6	75	Underburn		Withdrawn
35S-01E	3	994.2	24	DM-slash buster		Withdrawn
35S-01E	10	10-1	7	DM	Heli	Matrix
35S-02E	7	7-4	8	DM	Tractor	Matrix
35S-02E	17	17-3	16	DM	Heli	Matrix
35S-02E	18	10	6	Understory Thin		Matrix
35S-02E	18	18-4	20	DM	Tractor	Matrix
35S-02E	18	4	22	Understory Thin	Tractor	Matrix
35S-02E	19	19-5	17	Underburn		Matrix
35S-02E	19	19-6	15	DM	Heli	Matrix

OAK/PINE WOODLANDS

Township-Range	Sec-tion	Unit#	Acres	Presciption	Logging System	Land Allocation
34S-01E	3	6	69	Underburn		Withdra wn
34S-01E	9	2.1A	4	slash/handpile/burn		Withdra wn
34S-01E	9	2.1B	8	slash/handpile/burn		Withdra wn
34S-01E	9	2.2	55	slash buster/burn		Withdra wn
34S-01E	9	2.3	15	slash buster/burn		Withdra wn
34S-01E	9	5	38	Understory Thin		Withdra wn
34S-01E	9	5.1	11	Understory Thin		Withdra wn
34S-01E	9	5.2	27	Understory Thin		Withdra wn
34S-01E	10	1.1	10	slash/handpile/burn		Withdra wn
34S-01E	10	5	7	Understory Thin		Withdra wn
34S-01E	11	4.1	14	Underburn		Withdra wn
34S-01E	11	4.2	38	Underburn		Withdra wn
34S-01E	15	17	44	Understory Thin		Withdra wn
34S-01E	15	19	24	Understory Thin		Withdra wn
34S-01E	15	4.1	84	Understory Thin		Withdra wn
34S-01E	17	2	15	slash/handpile/burn		Withdra wn
34S-01E	17	3	2	slash/handpile/burn		Withdra wn
34S-01E	21	2	16	slash/handpile/burn		Withdra wn
34S-01E	33	5	71	DM-slash bus ter		Withdra wn
34S-01E	35	4.1	38	DM-slash bus ter		Withdra wn
34S-01E	35	4.2	93	slash buster/burn		Withdra wn
34S-01E	35	4.3	59	Underburn		Withdra wn
34S-01E	35	4.4	19	slash buster/burn		Withdra wn
34S-01E	35	6	20	slash buster/burn		Withdra wn
34S-02E	16	10.1	13	slash buster/burn		Withdra wn
34S-02E	16	9.1	75	slash buster/burn		Withdra wn
34S-02E	17	5.1	43	slash buster/burn		Withdra wn
34S-02E	17	5.2	40	slash buster/burn		Withdra wn
34S-02E	19	1.1	58	Underburn		Withdra wn
34S-02E	19	1.2	138	slash buster/burn		Withdra wn
34S-02E	20	3.1	72	slash buster/burn		Withdra wn
34S-02E	28	2.1	23	Understory Thin		Withdra wn
34S-02E	29	6.1	13	Understory Thin	ATV	Withdra wn

Township-Range	Sec-tion	Unit#	Acres	Presciption	Logging System	Land Allocation
34S-02E	34	5.1	16	slash buster/burn		Withdrawn
35S-01E	1	7	38	DM-slash buster		Withdrawn
35S-01E	3	1	23	Understory Thin		Withdrawn
35S-01E	3	7.1	16	slash buster/burn		Withdrawn
35S-01E	3	7.2	10	slash/handpile/burn		Withdrawn
35S-01E	3	7.3	5	slash/handpile/burn		Withdrawn
35S-01E	3	7.4	30	slash/handpile/burn		Withdrawn
35S-01E	3	994.1	25	Understory Thin		Withdrawn
35S-02E	7	4	70	DM-slash buster		Withdrawn

BRUSH FIELD TREATMENTS

Township-Range	Sec-tion	Unit#	Acres	Presciption	Logging System	Land Allocation
34S-01E	3	5.1	33.5	slash buster/burn		Withdrawn
34S-01E	3	5.2	13.3	slash buster/burn		Withdrawn
34S-01E	9	1.2	23.4	slash/handpile/burn		Withdrawn
34S-01E	9	1.5	14.5	slash/handpile/burn		Withdrawn
34S-01E	10	1.2	35	slash buster/burn		Withdrawn
34S-01E	10	1.3	2.4	slash/handpile/burn		Withdrawn
34S-01E	10	1.4	6.2	slash/handpile/burn		Withdrawn
34S-01E	10	1.5	4.6	slash/handpile/burn		Withdrawn
34S-01E	10	994	5	DM-slash buster		Withdrawn
34S-01E	15	17.2	7	slash/handpile/burn		Withdrawn
34S-01E	15	2.1	12.8	slash/handpile/burn		Withdrawn
34S-01E	15	2.3	8.1	slash buster/burn		Withdrawn
34S-01E	15	2.4	42.2	slash buster/burn		Withdrawn
34S-01E	15	2.5	7.1	slash buster/burn		Withdrawn
34S-01E	15	2.6	38.9	slash/handpile/burn		Withdrawn
34S-01E	17	4	27.5	slash buster/burn		Withdrawn
34S-02E	17	3.1	44	slash buster/burn		Withdrawn
34S-02E	17	3.2	138.9	slash buster/burn		Withdrawn
34S-02E	17	3.3	17.7	slash buster/burn		Withdrawn
34S-02E	19	6.1	53.4	slash buster/burn		Withdrawn
34S-02E	20	1.1	187.1	slash buster/burn		Withdrawn
34S-02E	28	6.2	10.4	slash/handpile/burn		Withdrawn
34S-02E	28	6.3	7	slash/handpile/burn		Withdrawn
34S-02E	29	2.1	25.3	slash buster/burn		Withdrawn
34S-02E	34	3.1	34	slash buster/burn		Withdrawn
35S-01E	1	8	134.4	slash buster/burn		Withdrawn
35S-01E	1	8.1	9	slash/handpile/burn		Withdrawn
35S-01E	1	8.2	24.4	DM-slash buster		Withdrawn
35S-01E	3	4	12.7	slash/handpile/burn		Withdrawn

GRASSLAND TREATMENTS

Township-Range	Sec-tion	Unit#	Acres	Presciption	Logging System	Land Allocation	veg type
34S-01E	9	1.1	16.2	meadow burn		Withdrawn	grass
34S-01E	9	1.3	9.5	meadow burn		Withdrawn	grass
34S-01E	9	1.4	4.2	meadow burn		Withdrawn	grass
34S-01E	9	1.6	4.5	meadow burn		Withdrawn	grass
34S-01E	9	1.7	11.1	meadow burn		Withdrawn	grass
34S-02E	8	7	26.6	meadow burn		Withdrawn	grass
34S-02E	16	7.1	101.3	meadow burn		Withdrawn	grass
34S-02E	16	8.1	2.3	meadow burn		Withdrawn	grass
34S-02E	28	6.1	72.9	meadow burn		Withdrawn	grass
34S-02E	31	3.1	16.3	meadow burn		Withdrawn	grass
34S-02E	33	5.1	60.5	meadow burn		Withdrawn	grass
34S-02E	34	3.2	83.6	meadow burn		Withdrawn	grass

TOTAL ACRES: 5192

PRESCRIBED TREATMENT

SELECTIVE CUT: 139 ACRES

REGENERATION HARVEST: 27 ACRES

DENSITY MANAGEMENT: 749 ACRES

UNDERSTORY THIN: 1680 ACRES

UNDERBURNING: 420 ACRES

BRUSH REDUCTION (SLASHBUSTER OR HAND SLASH): 1768 ACRES

GRASSLAND BURNING: 409 ACRES

TRACTOR: 322 ACRES

CABLE: 29 ACRES

HELICOPTER: 372 ACRES

TRACTOR & CABLE: 91 ACRES

TRACTOR & HELICOPTER: 124 ACRES

SLASHBUSTER: 1865

ATV (LOW GROUND PRESSURE YARDER): 56 ACRES

HAND THIN OR SLASH: 1504 ACRES

LOGGING SYSTEMS/TREATMENT METHOD:

Appendix F Marking guides final version 3/04/02

LOWER BIG BUTTE MARKING GUIDELINES

Summary of treatment objectives

1. To favor a return to the seral phase of the white fir and Douglas-fir plant series as a long term silvicultural approach to provide for sustainable forest conditions.
2. To reduce wildfire risks for conifer stands within the rural interface by reducing ladder fuels, surface fuels and crown bulk densities. Desired canopy closures are between 40% to 60%.
3. In merchantable second growth stands, to thin from below to redistribute growth to vigorous dominant and co-dominant trees.
4. To reduce density levels towards the carrying capacity of the site. In selectively cut stands, remove individual trees across all diameter classes to reduce inter-tree competition while maintaining or promoting the development of multiple canopy layers.
5. To regenerate deteriorating stands and stands with Douglas-fir infected with dwarf mistletoe; and to prepare units for seedling establishment and growth by providing suitable site conditions for planting.
6. To maintain coarse woody debris, snags and large green conifers for long term site productivity and biological legacies.
7. To return areas of diminished conifer productivity to their full, long term capability.
8. To reduce stocking levels as well as conifer and brush encroachment in oak/pine woodlands to provide for increased mast production, forage palatability and reduced fire severity.

ALL COMMERCIAL TREATMENT AREAS - To maintain elements of habitat diversity, specifically for neo-tropical migratory birds, it is desired that existing thickets be retained within commercial as well as non-commercial treatment areas. Objectives are to provide for scattered patches at an approximate equivalent of 2 acres for every 10 acres treated within a given unit. Undisturbed patches within or adjacent to a treatment area may be provided with riparian buffers, survey and manage buffers, inaccessible edges left out of a unit area or adjacent stands where treatment has been deferred. Additional areas left as undisturbed within a treatment should be situations where an understory component is retained. This could be inclusions of vigorous regeneration or a patch of hardwoods where there is no real harvest need or opportunity. These areas should be identified informally and not be specifically designated for avoidance such as survey and manage buffers. The intent is to identify areas that are conducive to being left in tact as a result of terrain and or location within or immediately next to a treatment area. In selecting an area to retain undisturbed within harvest boundaries, consideration of marking additional leave trees or avoidance of marking a few cut trees may be required to minimize the potential for activity through the reserve patch.

SELECTIVE CUT (SC)

1. 40% canopy closure, the removal of poor vigor trees, density reduction and establishment of regeneration in low vigor inclusions are the primary objectives for these stands.

* Dependant upon the spatial arrangement of poor vigor trees, some areas may have canopy closure greater than 60%, and in other areas less than 40%. Variability is okay, the objective is a stand average of 40% or greater (refer to the attached canopy closure guide).
* 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 poor 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% of the trees are 8- 20" dbh, 20% of the trees are 20-32" dbh and 10% of the trees are 32"dbh or greater, then the majority of the trees selected would be in the 8-20" size class with lesser amounts marked in the 20-32" size class and even fewer marked that are greater than 32" dbh.
* The average residual basal area of treated stands will range between 100 to 140 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 and species selection is more important than meeting a spacing requirement. The existing condition of some units will result in highly variable levels of basal area retention from one area to the next. The intent is to provide for the stand average basal area prescribed for to within +/- 20 sq. ft./acre.
* Trees will be marked across all diameter classes up to but not including 50" dbh trees and in general trees greater than 30" dbh. Trees in excess of 50" dbh may **only** be removed if they are heavily infected with mistletoe (mistletoe rating >4) **and** threaten the health of the surrounding stand. Trees greater than 30" dbh may be removed if they exhibit deteriorating crown and tree conditions (salvage) and/or their removal provides for attaining overall stand objectives such as release of existing pine species. Units in which removal of larger trees may consist of more than just a few individuals are identified in the marking guides.

2. Favor drought and fire tolerant tree species. Given equal size and vigor, species to favor in order of preference are sugar pine, ponderosa pine, Douglas-fir, incense cedar and hardwood species. Removal of larger trees to favor a smaller tree of a preferred species is acceptable if an adequate representation of the larger size class is retained in the treatment area. In general, white fir should be discriminated against because of it's low tolerance of fire, drought, and root diseases. This does not mean all white fir are to be removed. White fir should be left where necessary to meet density levels and when it is a more vigorous tree than adjacent preferred species.

3. When available release around vigorous dominant or co-dominant ponderosa pine and sugar pine. All trees, regardless of size class or vigor, underneath the dripline of released pines should be removed. Additionally, all trees up to 20" dbh within 15' of the dripline should be removed. Pine species selected for release should have full crowns with dark green foliage and minimal weak spots. Pine species with poor crowns characterized by a ragged appearance as well as foliage which is bunchy and of poor color should be removed or retained for wildlife purposes only, do not release around.

4. Leave all hardwoods greater than 14"dbh, for species diversity, canopy layers and root disease resistance.

5. Leave all existing snags, stages 1-5, except those that are a safety hazard. Dying trees (ie from bark beetles) can be considered for salvage removal given the tree is expected to be salvable at the time of harvest.

6. Leave all coarse woody debris, decay classes 1-5.

7. Minimize the removal 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.

8. Avoid retention of trees with obvious stem decay (pini conks) over adjacent healthy trees. Infected trees should be salvaged for their current volume and only be retained when being left as a potential snag.

Unit: 34-1E. 15-1, 10 acres, Target Average BA 100 sq.ft.- Retention of merchantable trees is expected to average 80 sq. ft/acre. with 8" dbh and less at approximately 20 sq. ft/acre. This unit has 2 structure types grading from west to east. The western 1/2 of the unit has defined clumps of mature overstory trees. In mature clumps, thin out approximately 1/3 of the existing basal area with emphasis on removing low vigor trees and releasing mature pines and incense cedar. Where low vigor trees dominate, retain the only desirable overstory available and open the area up for seedling establishment (1 to 3 acres may fit this condition). In the eastern ½ of the unit (adjacent to Crowfoot road) trees become more even aged in structure. For this portion, thin to a relative density of 35% (estimated BA retention in thinning would be 100-120 BA).

Unit: 34-1E. 25-1, 11 acres, Target Average BA 100 sq. ft. - Retention of merchantable trees is expected to average 80-90 sq. ft/acre. Low vigor trees are common across all diameter classes. Risk mark across all size classes favoring the better individuals to meet the target basal area. Pockets of mature lower vigor trees exist which will not benefit from density reduction. These areas should be opened up for seedling establishment retaining overstory trees greater than 20" dbh at 40 to 60 sq. ft/acre. No more than 1/3 of the unit area however should be opened up for seedling establishment. Trees greater than 30" d.b.h. will need to be considered for removal in areas to be opened adequately for regeneration and in cases to provide adequate release of adjacent more vigorous individual trees. **Within the southern 1/3 of the treatment area, all trees greater than 30" d.b.h. shall be retained to ensure roosting sites are retained for the adjacent bald eagle nest site.**

Unit: 34-2E, 19-4. 44 acres, Average BA 110 sq. ft. - Retention of merchantable trees is expected to average 80-100 sq. ft/acre. This unit has scattered & variable levels of mature overstory with extremely high understory stocking. Objectives are to enhance understory development while maintaining a multistoried stand condition with a high level of species diversity. Risk mark merchantable trees across all diameter classes and thin as appropriate to a relative density of 35%. Marking should take into consideration future development of the understory (ie; residual damage to preferred understory species may warrant retention of individual merchantable/trees and/or opportunities to release the understory may warrant thinning to levels slightly below 35 % RD.). Follow up thinning of sub-merchantable will be needed to establish proper stocking levels. Removal of trees greater than 30" d.b.h. is appropriate to release vigorous ponderosa pine or

sugar pine and where salvage of low vigor individuals will improve development of adjacent trees.

Unit: 34-2E, 28-1, 55 acres, Average BA 140 sq. ft. - Mature mixed conifer stand on steep slopes with a VRM II classification. Marking will be variable across the treatment area. Evenaged pockets of 12" to 21" dbh Douglas-fir exist which should be thinned from below to a relative density of 40%. Inclusions of mature overstory with hardwoods and suppressed Douglas-fir or incense cedar regeneration should be harvested as a shelterwood retention providing for 12 to 25 trees/acre over 20" dbh. The number of trees to retain should be based on the average diameter and resulting residual basal area. Target a basal area retention level of 60 to 80 square feet/acre for areas harvested as a shelterwood retention. Incidental trees greater than 50" dbh may be considered for removal to favor preferred species and stocking objectives. Trees along the edges of and within steep headwalls as well as areas of localized instability should not be harvested.

Unit: 35-01, 1-2 & 1-4. 20 acres, Average BA 100 - 140 sq. ft. - The treatment area basically has three diameter classes, 30"+(50% healthy), 20" - 30"(mistle-toe with moderate to low vigor), and 6" - 20" (50% young and vigorous 50% suppressed or with mistletoe). The southern edge of the unit grades towards a steep head wall and the north edge of the unit is adjacent to an irrigation canal. Density management should be the only treatment in these areas to maintain rooting strength from the more dominant trees. Throughout the unit risk mark the mature overstory and midstory with the objective of releasing adjacent codominant or dominant trees and, in cases, pockets of vigorous understory trees that range from 6" - 20" in diameter. Trees expected to die within the next 5-10 years should be salvaged. Where larger trees are present, marking should favor healthier ponderosa pine, sugar pine and incense cedar. Density management should provide for 35% relative density at 40% canopy closure(100 -120 sq.ft/acre in smaller diameter patches). There are several pockets of evenaged Douglas-fir in relatively poor condition in which selection of leave trees will be hard but objectives are to maintain an open evenaged condition. Within the central portion of the unit (below the road) there is opportunity to retain larger healthy pine and cedar in a consistent manner (3-4 acre area). Where this occurs marking should open the stand up releasing better individuals providing for a seed tree/shelterwood level of retention. Basal area retention for this portion should average 40 to 60 sq.ft/acre but may range from 0-100 depending on tree quality in a given spot. Removal of 50" trees is appropriate where it is effective in reducing mistle-toe infection and removal of 30"+ trees is appropriate to favor pine species.

MODIFIED EVEN-AGED - REGENERATION HARVEST (RH)

UNITS: T34S R2E 33-03

The **minimum** requirements are:

1. 1.8 wildlife trees/acre. See the table below for the existing number of snags/acre.
2. 120 linear feet of CWD. See the table below for the existing level of CWD.
3. 6-8 green conifers/acre, >20" dbh (proportionally representing the total range of tree sizes >20"). 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/crown vigor as opposed to the strict implementation of the 6-8 leave tree guideline. Let tree condition dictate where and how many trees are left. Leave trees should have the following attributes: a). Windfirm b). Crown ratio >35% with a healthy crown, dark foliage, dense needles c). Disease free (specifically mistletoe free Douglas-fir) d). Favor healthy seral species, ponderosa pine, sugar pine, incense cedar, where possible.
4. All healthy ponderosa pine, Douglas-fir, incense cedar, and sugar pine regardless of size should be left (<1"-20"dbh). These trees should have the following attributes: a). crown ratios 35% b). healthy foliage c). disease and insect free.
5. Retain all large hardwoods greater than 14 " dbh and provide for at least 3 hardwoods/acre > 10" dbh in units where larger hardwoods are lacking.
6. Units do not have to be uniform in appearance; diversity, patchiness is desirable. Unit 33-03 is such that the south and western portions will be deficit of the retention requirements with other portions having the opportunity to retain groups of trees in excess of the retention requirements.

EXISTING CONDITIONS

UNIT	ACRES	SNAGS/ACRE > 16"DBH DECAY CLASS1&2	CWD/LFT/ACRE DECAY CLASS 1&2, >16" 16'
33-03	27*	0.8	0

* approximate acres, layout and traversing may result in minor changes.

COMMERCIAL THINNING (CT) & DENSITY MANAGEMENT (DM)

Matrix Lands

Township-range	Section	Unit ID	Acres	% Relative Density		Township-range	Section	Unit ID	Acres	% Relative Density
34S-01E	9	9-1	3	35		34S-02E	34	34-1	56	35
34S-01E	9	9-4	12	35		34S-02E	34	34-2	9	40
34S-01E	25	25-3	28	35		34S-02E	34	34-3	13	40
34S-01E	25	25-5	33	35		35S-01E	1	1-1	15	35
34S-01E	35	35-2	10	35		35S-01E	1	1-3	46	40
34S-01E	35	35-3	17	35		35S-01E	3	3-3	14	40
34S-02E	9	9-1	15	40		35S-01E	3	3-4	12	35
34S-02E	16	16-1	104	40		35S-01E	3	3-5	7	35
34S-02E	16	16-2	10	35		35S-01E	10	10-1	7	35
34S-02E	16	16-3	9	35		35S-01E	10	10-2	9	35
34S-02E	16	16-4	25	40		35S-01E	11	11-1	30	45
34S-02E	17	17-1	33	40		35S-01E	11	11-2	14	40
34S-02E	18	18-1	8	35		35S-01E	11	11-4	11	40
34S-02E	18	18-2	9	40		35S-01E	12	12-1	19	40
34S-02E	19	18-2	9	40		35S-02E	7	7-4	8	35
34S-02E	19	19-1	18	40		35S-02E	17	17-3	16	40
34S-02E	29	29-1	46	40		35S-02E	18	18-4	20	35
34S-02E	33	33-4	10	40		35S-02E	19	19-6	15	35

1. Density reduction and the retention of at least 40% - 60% canopy closure are the primary objectives for these stands. Thin from below in second growth stands/clumps.
   * Stocking will be reduced to Relative Densities of 35-45%, See above for target levels. Because stand conditions are variable keep in mind during the marking process that relative densities may be varied somewhat as stand conditions change. However the relative density prescribed should result as an overall stand average. Relative densities of 35% should generally apply to areas where pine is common and being favored as a stand component or where residual trees appear relatively young and vigorous (less than 80 years) with average tree diameters less than 18" dbh. Relative densities of 40% generally apply to more developed stand conditions where residual trees are at age 100 or greater and residual diameters tend to be equal to or greater than 18"dbh. Additionally for reduced windthrow potentials relative densities should trend towards 40-45% where height to diameter ratios of 80 or more are present (specifically unit 35S-01E, 11-02).
   * Leave trees need to be dominant and codominant with the best crown ratios.
   * Favor healthy individuals with the following order of species preference; sugar pine, ponderosa pine, incense cedar, and Douglas-fir. White fir should generally be discriminated against.
   * Trees to be removed are in excess of wildlife, CWD and biological diversity needs.

2. Emphasis should be placed on retaining higher vigor remnant overstory trees > 30"dbh.

Large diameter trees may be thinned to release adjacent large diameter trees or are lower vigor trees which may qualify as salvage or which pose an insect or disease risk to the residual stand. When available release around vigorous dominant or co-dominant ponderosa pine and sugar pine. All trees, regardless of size class or vigor, underneath the dripline of released pines should be removed. Additionally, all trees up to 20" dbh within 15' of the dripline should be removed. Pine species selected for release should have full crowns with dark green foliage and minimal weak spots.

3. Trees with mistletoe ratings greater than 2 (except incense cedar) should be considered for removal. Additionally, trees with evidence of stem decay should be salvaged. Cull trees may be left for wildlife where competition to desired healthy trees is not compromised.
4. Leave all hardwoods greater than 14" in diameter or provide for 3 hardwoods/acre greater than 10"where larger hardwoods are lacking
5. Leave all pre-existing snags (stages 1-5). Salvage of dying can be considered for removal given the tree will be salvable at the time of harvest.

Withdrawn lands

Township-range	Section	Unit ID	Acres	% Relative Density
34S-02E	28	28-4	12	45
34S-02E	34	34-1W	7	45
35S-01E	3	3-2	11	35

1. Ladder fuel reduction and the retention of at least 60% canopy closure are the primary objectives for these stands. Thin from below to the target canopy closure. Stocking reduction to a relative density of 45% will generally provide for a 60% canopy closure. In units 35S-01E 3-1 & 3-2, release around sugar pine and ponderosa pine will result in a average relative density of 35% with canopy closures ranging from 40 to 60% where pines occur.
   * Leave trees need to be dominant and codominant with the best crown ratios.
   * Favor healthy individuals with the following order of species preference; sugar pine, ponderosa pine, incense cedar, and Douglas-fir. White fir should generally be discriminated against.
   * Trees to be removed are in excess of wildlife, CWD and biological diversity needs.

2. Emphasis should be placed on retaining higher vigor relatively larger trees. Trees greater than 20" diameter will be retained unless mistletoe infection warrants removal. Dominant and codominant trees less than 20" d.b.h. should be thinned to provide for the target average canopy closure. Select for removal smaller less vigorous individuals, or dominant and codominants which pose an insect or disease risk to the residual stand. When available release around vigorous dominant or co-dominant ponderosa pine and sugar pine. All trees, less than 20" d.b.h. and underneath the dripline of released pines, should be removed regardless of vigor. Additionally, all trees up to 20" dbh within 15' of the dripline should be removed. Pine species selected for release should have full crowns with dark green foliage and minimal weak spots.

3. Trees, regardless of size class, with mistletoe ratings greater than 2 (except incense cedar) should be considered for removal. Cull trees should be left for wildlife where competition to

desired healthy trees is not compromised.

4. Leave all hardwoods greater than 14" in diameter or provide for 3 hardwoods/acre greater than 10"where larger hardwoods are lacking.

5. Leave all pre-existing snags (stages 1-5). Trees which are obviously dying (will be dead in a year) should be retained as a snag.

UNDER STORY THINNING CONIFER STANDS (US).

Township-range	Section	Unit ID	Acres		Township-range	Section	Unit ID	Acres
34S-01E	3	4	61		34S-01E	33	4	10
34S-01E	9	11	9		34S-01E	35	1	14
34S-01E	9	13	22		34S-01E	35	3	12
34S-01E	9	2.1	13		34S-02E	16	3.1	11
34S-01E	9	3	4		34S-02E	16	4.1	18
34S-01E	9	4	10		34S-02E	16	6.1	86
34S-01E	9	6	43		34S-02E	17	6.1	24
34S-01E	9	7	22		34S-02E	17	7.1	6
34S-01E	9	9	33		34S-02E	19	2.1	28
34S-01E	10	10	4		34S-02E	20	2.1	11
34S-01E	10	11	3		34S-02E	21	2.1	21
34S-01E	10	3.1	17		34S-02E	21	2.2	54
34S-01E	10	3.2	12		34S-02E	21	5.1	5
34S-01E	10	4	12		34S-02E	21	7.1	8
34S-01E	10	6.1	13		34S-02E	28	1.1	11
34S-01E	10	7	1		34S-02E	28	3.1	14
34S-01E	10	8	23		34S-02E	28	5.1	14
34S-01E	10	9	2		34S-02E	28	8.1	39
34S-01E	11	1	5		34S-02E	28	8.2	14
34S-01E	11	1	8		34S-02E	28	8.3	16
34S-01E	11	5	14		34S-02E	28	9.1	21
34S-01E	11	6	3		34S-02E	29	5.1	16
34S-01E	11	6	14		34S-02E	29	5.2	6
34S-01E	14	1	1		34S-02E	34	6.1	11
34S-01E	15	1	8		34S-02E	34	7.1	20
34S-01E	15	20	12		34S-02E	34	34-4	13
34S-01E	15	3.1	16		34S-02E	34	6.2	20
34S-01E	15	3.2	15		34S-02E	35	18.1	18
34S-01E	15	4.2	2		35S-01E	3	5	7
34S-01E	15	4.3	3		35S-01E	3	994.2	24
34S-01E	15	5	32		35S-01E	11	1	15
34S-01E	15	6	13		35S-02E	18	4	22
34S-01E	17	1	29		35S-02E	18	10	6
34S-01E	21	1	24					

Early and mid seral stand structures (0-11 inches d.b.h.)

1. Density reduction and the retention of at least 40% - 60% canopy closure are the primary objectives for these stands.

2. Thin smaller and less vigorous trees between 1 and 8 inches d.b.h.. Conifers between 1&3 inches d.b.h. will be thinned to a 15 by 15 ft. spacing. Dominant trees will be used to space off of. Conifers greater than 3 inches d.b.h. will have spacing determined by crown width. Trees will be spaced so that there is ½ crown width between crowns. Trees from 5-8 inches d.b.h. which are not going to be removed from the site will be girdled rather than felled. On all pine trees greater than 12" d.b.h., all trees between 1" and 8" shall be removed 10 feet out from the dripline of the crown. Slash all brush and hardwoods (less than 12" d.b.h.). Additionally conifers over 1 foot tall and excess to spacing needs should be slashed. Species preference in selecting leave trees is as follows: Sugar pine, ponderosa pine, Douglas-fir, incense cedar, true fir.

3. Prune all conifers which are taller than 16 feet to a height of 8 feet from ground level. Cut limbs and tops free of slashed tree boles and pile and burn as needed for hazard reduction.

4. Inclusions with more developed stand conditions should be treated as described for late and mature seral stands.

Late and mature seral stand structures (11 inches d.b.h. and larger)

1. Increasing crown base height through the reduction of ladder fuels is the primary objective with these stands. A 60% residual canopy closure is desired where current stocking and tree size classes allow for this level of reduction.

2. Thin from below removing smaller and less vigorous trees which are 8"d.b.h. or less. Whenever possible, smaller trees should be removed to attain a 60% canopy closure. Where practical, removal of 8" and smaller trees should work towards providing species selection criteria as described for early to mid seral stand conditions. Regardless of condition, trees greater than 8"d.b.h. should be left at the current stocking and canopy closure levels. Exceptions to this are in matrix stands where utilization of material is possible and specific administratively withdrawn stands where release of seral species is desired **(refer to exceptions list below)**.

3. Provide for retention of scattered pockets of undisturbed under story (throughout treatment areas) to provide structural diversity and cover for wildlife. Provide for an approximate equivalent of 1 acre for every 5 acres treated as undisturbed within a given section. Locate undisturbed patches along riparian inclusions, adjacent untreated stands, survey and manage buffers, and where relatively healthier groups of under story are present. Along meadow edges it is also desirable to maintain understory screening of game trails where they occur. To ensure fuel management objectives are provided for, reserve patches should be in a scattered pattern and towards the interior of the treatment area.

4. Prune all conifers which are taller than 16 feet to a height of 8 feet from ground level. Cut limbs and tops free of slashed tree boles and pile and burn as needed for hazard reduction.

5. Inclusions with smaller early seral stand conditions should be treated as described for early and mid seral structures.

Exceptions: Removal of trees greater than 8" d.b.h. may occur within treatment areas where activity is 300 feet away from natural openings. On matrix lands, trees greater than 8 inches

d.b.h. may be removed where there is opportunity to utilize the material and harvest is appropriate for stocking and growth objectives. For withdrawn lands, removal of trees up to 14" may occur **only** where there is an opportunity to release around vigorous dominant or co-dominant ponderosa pine, sugar pine or large remnant hardwoods greater than 14" dbh. All trees, less than 14" d.b.h. and underneath the dripline of released pines & hardwoods, should be removed regardless of vigor. Additionally, all trees up to 14" dbh within 15' of the dripline should be removed. Pine species selected for release should have full crowns with dark green foliage and minimal weak spots. Hardwoods should be at least 14" or greater in diameter and have at least 30% live crown. To avoid Douglas-fir bark beetle buildups, in areas where removal of felled material is not possible, no more than 3 Douglas-fir trees/acre greater than 12" d.b.h. should be cut. Treatment areas where release of seral trees may be appropriate are as follows:

Township-range	Section	Unit ID	Acres		Township-range	Section	Unit ID	Acres
34S-01E	3	4	61		34S-02E	16	3.1	11
34S-01E	9	2.1	13		34S-02E	16	4.1	18
34S-01E	9	4	10		34S-02E	16	6.1	86
34S-01E	9	7	22		34S-02E	17	6.1	24
34S-01E	9	9	33		34S-02E	19	2.1	28
34S-01E	10	10	4		34S-02E	21	2.1	21
34S-01E	10	11	3		34S-02E	29	5.1	16
34S-01E	10	3.1	17		34S-02E	29	5.2	6
34S-01E	10	3.2	12		34S-02E	34	6.1	11
34S-01E	11	1	8		34S-02E	34	7.1	20
34S-01E	11	6	3		35S-01E	3	994.2	24
34S-01E	15	4.2	2		35S-01E	11	1	15
34S-01E	21	1	24		35S-02E	7	4	70
34S-01E	33	4	10		35S-02E	18	4	22

*note - Edges of OI units may be adjacent to existing natural opening and will require a 300 foot buffer in which no trees greater than 8" d.b.h. are cut.

Underburning Conifer Stands.

Township-Range	Section	Unit ID	Acres
34S-01E	3	1	7
34S-01E	3	2	9
34S-01E	3	3	9
34S-01E	9	8.1	17
34S-01E	11	3	30
34S-02E	8	4	2
34S-02E	8	5	18
35S-01E	3	6	75
35S-02E	19	19-5	17

1. Slash 8" d.b.h. and smaller conifers as needed to reduce the potential for torching overstory trees and creation of surface fuels to carry fire during cooler season burning windows.

2. Underburn to reduce ladder fuel and surface fuel accumulations. Provide for 40 % - 60% top kill to the understory brush, Douglas-fir and incense cedar components between 0 and 8" diameter. For trees 8" to 14" in diameter, mortality should be limited to no more than 5% to 10%. Minimize mortality to trees 16" d.b.h. and larger to no more than 5% over the entire

treatment area with no more than a total of 10% killed on a given acre. To avoid latent mortality in overstory trees, crown scorch should be limited to the lower 1/3 of the crown and or maintain 30% live crown in an un-scorched condition.

2. Provide for reduction of fine surface fuels and reduction in surface fuel continuity by providing ground scorch and consumption of the litter layer across 60% to 80% of a given treatment area.

3. Provide for 90%+ retention of decay class 1 & 2 woody debris 16" or greater in diameter and retention of 40 to 60% of existing large woody debris (greater than 16") in decay classes 3 to 5. Incidental mortality of larger trees can offset consumption of existing down wood should it occur.

4. Limit consumption of duff and the fine humus layer to maintain soil nutrients and minimize bare mineral exposure to 10% or less. Additionally provide for exclusion of fire activity within 150 ** feet of perennial streams and allow only backing fire activity within 50** feet of intermittent streams.

5. Monitor treatment areas to evaluate appropriateness of the above prescription parameters with respect to meeting overall resource objectives and feasibility of accomplishment. Areas of concentrated mortality or stressed trees should be monitored for two growing seasons to evaluate potential insect concerns (Pine or Douglas-fir beetles).

Pine & Oak Woodlands.

Primary objectives are to reduce conifer and brush encroachment as well as improved growth of over story trees using a variety of treatment methods.

Thinning (DM-slash buster and under story thinning)

Township-Range	Section	Unit ID	Acres
34S-01E	9	5	38
34S-01E	9	5.1	11
34S-01E	9	5.2	27
34S-01E	10	5	7
34S-01E	15	17	44
34S-01E	15	19	24
34S-01E	15	4.1	84
34S-01E	33	5	71
34S-01E	35	4.1	38
34S-02E	28	2.1	23
34S-02E	29	6.1	13
35S-01E	1	7	38
35S-01E	3	1	23
35S-01E	3	994.1	25
35S-02E	7	4	70

1. Cut or girdle hardwood clumps back to one main stem. No hardwoods over 12" should be cut. In areas dominated by hardwoods, space residual hardwoods to ½ a crown width between crowns. Cut all understory brush and conifers over 1 foot tall which are excess to spacing needs.

Species preference for hardwoods is as follows: Black oak, White oak, Madrone. Favor conifers over hardwoods only where the individual conifer is larger than adjacent hardwood trees. Any species of conifer, hardwood or brush considered as rare (less than 5% coverage) within the entire unit will be left.

2. For inclusions dominated by conifers thin understory trees using the same criteria as described for understory thinning in conifer stands.

3. Prune all conifers which are taller than 16 feet to a height of 8 feet from ground level.

4. Provide for an approximate equivalent of 1 acre for every 5 acres treated as undisturbed within a given unit. Locate undisturbed patches along riparian inclusions, adjacent untreated patches, and along game trails. Utilize survey and manage buffer areas, inaccessible or rocky areas as well to provide for reserve areas. To ensure fuel management objectives are provided for, reserve patches should be placed in a scattered pattern and towards the interior of the treatment area. However it is desirable to locate undisturbed clumps near edges when it will provide for screening of wildlife from open roads.

Brush Reduction (Slash buster/burn or Slash/hand pile/burn)

Township-Range	Section	Unit ID	Acres		Township-range	Section	Unit ID	Acres
34S-01E	3	5.1	34		34S-02E	16	10.1	13
34S-01E	3	5.2	13		34S-02E	16	9.1	75
34S-01E	9	1.2	23		34S-02E	17	3.1	44
34S-01E	9	1.5	15		34S-02E	17	3.2	139
34S-01E	9	2.1A	4		34S-02E	17	3.3	18
34S-01E	9	2.1B	8		34S-02E	17	5.1	43
34S-01E	9	2.2	55		34S-02E	17	5.2	40
34S-01E	9	2.3	15		34S-02E	19	1.2	138
34S-01E	10	1.1	10		34S-02E	19	2.2	10
34S-01E	10	1.2	35		34S-02E	19	6.1	53
34S-01E	10	1.3	2		34S-02E	20	1.1	187
34S-01E	10	1.4	6		34S-02E	20	3.1	72
34S-01E	10	1.5	5		34S-02E	28	5.2	11
34S-01E	10	994	5		34S-02E	28	6.2	10
34S-01E	15	17.2	7		34S-02E	28	6.3	7
34S-01E	15	2.1	13		34S-02E	29	2.1	25
34S-01E	15	2.3	8		34S-02E	29	6.2	39
34S-01E	15	2.4	42		34S-02E	34	3.1	34
34S-01E	15	2.5	7		34S-02E	34	5.1	16
34S-01E	15	2.6	39		35S-01E	1	8	134
34S-01E	17	1.1	43		35S-01E	1	8.1	9
34S-01E	17	2	15		35S-01E	1	8.2	24
34S-01E	17	3	2		35S-01E	3	4	13
34S-01E	17	4	28		35S-01E	3	7.1	16
34S-01E	21	2	16		35S-01E	3	7.2	10
34S-01E	35	4.2	93		35S-01E	3	7.3	5
34S-01E	35	4.4	19		35S-01E	3	7.4	30
34S-01E	35	6	20					

1. Slash all brush species less than 12 inches main stem diameter and all conifers less than 6

inches at ground level.

2. Where groups of hardwoods occur in excess of reserve needs cut or girdle hardwoods back to one main stem as described for hardwood thinning.

3. Any species of conifer, hardwood or brush considered as rare (less than 5% coverage) within the entire unit will be left.

4. Provide for an approximate equivalent of 1 acre for every 5 acres treated as undisturbed within a given unit. Locate undisturbed patches along riparian inclusions, adjacent untreated patches, and along game trails. Utilize survey and manage buffer areas and inaccessible or rocky areas as well to provide for reserve areas. To ensure fuel management objectives are provided for, reserve patches should be placed in a scattered pattern and towards the interior of the treatment area. However it is desirable to locate undisturbed clumps near edges when it will provide for screening of wildlife from open roads.

Underburning Oak & Pine Woodlands

Township-Range	Section	Unit ID	Acres
34S-01E	3	6	69
34S-01E	11	4.1	14
34S-01E	11	4.2	38
34S-02E	19	1.1	58
34S-01E	35	4.3	59

1. For ladder fuel reduction, establishment of grass and brush re-sprouting; burn to provide for topkill of under story brush, conifer and hardwood species less than 6" in diameter to a level where residual coverage is reduced to 20% to 40% of the area. Limit mortality to oak trees greater than 6" in diameter to 5% or less for retention of structural diversity and continued development of larger individual trees. Where conifers are present, it is desirable to minimize mortality to larger individuals. Mortality to conifers greater than 16" diameter should be limited to 10% or less for a given treatment area.

2. Provide for reduction of fine surface fuels and reduction in surface fuel continuity by providing ground scorch across 60% to 80% of a given treatment area.

3. Provide for exclusion of fire activity within 150 ** feet of perennial streams and allow only backing fire activity within 50** feet of intermittent streams.

RELATIVE DENSITY GUIDELINES

Use RD 35-45 when thinning in stands dominated by Douglas-fir.

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.

RELATIVE DENSITY - 35%		
AVERAGE LEAVE TREE DBH	LEAVE TREE BASAL AREA	AVERAGE LEAVE TREE SPACING
8"	92	13' X 13'
10"	101	15' X 15'
12"	108	18' X 18'
14"	115	20' X 20'
16"	121	22' X 22'
18"	127	25' X 25'
20"	133	27' X 27'
22"	138	29' X 29'
24"	143	31' X 31'
26"	147	33' X 33'
28"	152	35' X 35'
30"	156	37' X 37'

RELATIVE DENSITY - 40%		
AVERAGE LEAVE TREE DBH	LEAVE TREE BASAL AREA	AVERAGE LEAVE TREE SPACING
8"	106	12' X 12'
10"	116	14' X 14'
12"	124	17' X 17'
14"	132	19' X 19'
16"	139	21' X 21'
18"	146	23' X 23'
20"	152	25' X 25'
22"	158	27' X 27'
24"	163	29' X 29'
26"	169	31' X 31'
28"	174	33' X 33'
30"	178	35' X 35'

RELATIVE DENSITY - 45%		
AVERAGE LEAVE TREE DBH	LEAVE TREE BASAL AREA	AVERAGE LEAVE TREE SPACING
8"	119	11' X 11'
10"	130	14' X 14'
12"	139	16' X 16'
14"	148	18' X 18'
16"	156	20' X 20'
18"	164	22' X 22'
20"	171	24' X 24'
22"	177	25' X 25'
24"	183	27' X 27'
26"	189	29' X 29'
28"	195	31' X 31'
30"	200	33' X 33'

Definition: Poor Vigor - High Risk of Mortality

Trees available for removal as poor vigor - high risk include:

1. Poor vigor trees

a. Poor vigor, high risk ponderosa pine trees are defined as those trees meeting the criteria for risk classes #3 and #4, see attached guide.

b. High risk 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. Trees affected by root rot, visual characterisitcs 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.

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, 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.

Appendix G

FISHERIES/AQUATIC ECOSYSTEM REPORT

Fish Passage Barriers

The primary barriers for adult and juvenile fish in the WAU are manmade structures such as culverts and irrigation diversions. In addition to human-created barriers to fish migration, there are also barriers which occur naturally such as waterfalls, steep steps, debris jams, and high stream gradient. Stream surveys have documented two large waterfalls on Clark Creek which block upstream migration, although resident cutthroat trout are found above these barriers. There is also a twenty foot waterfall on McNeil Creek which marks the upper limit of fish use. The seasonal effects of these natural features range from delayed to complete obstruction of upstream migration by adult and juvenile fish.

Fisheries Distribution

There are approximately 47 miles of fish-bearing streams within the Lower Big Butte Creek watershed. (Maps 6 & 11) Approximately 27 miles of these streams contain anadromous fish populations including chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), steelhead trout (*O. mykiss*), and Pacific lamprey (*Lampetra tridentata*). Other native fish species in the watershed include cutthroat trout (*O. clarki)*, rainbow trout *(O. mykiss)*, and reticulate sculpin (*Cottus perplexus*).

Two Special Status fish species utilize the Lower Big Butte Creek watershed for spawning and rearing: Southern Oregon/Northern California coho salmon (*O. kisutch*), and Klamath Mountain Province steelhead (*O. mykiss*). The National Marine Fisheries Service (NMFS) listed coho salmon in the Rogue and Klamath River basins on May, 1997 as "threatened" under the Endangered Species Act. Steelhead trout were listed by NMFS as a sensitive "at-risk" candidate in March, 1998. NMFS proposed listing the chinook salmon (*O. tshawytscha*) as "threatened" under the Endangered Species Act in February, 1998. A determination was made in September, 1999 to exclude the relatively healthier southern Oregon runs from listing at this time.

Introduced fish found in the watershed include largemouth bass *(Micropterus salmoides)*, redside shiners *(Richardsonius balteatus)*, and bluegill *(Lepomis macrochirus)*. Bluegill were documented in 1998 in the ODFW/BLM fish trap on Lower Big Butte Creek; however, complete range of distribution is unknown.

Stream Channel

The Oregon Department of Fish and Wildlife (ODFW) conducted stream surveys in the Lower Big Butte WAU on Dog Creek, Box Creek and Crowfoot Creek in 1996. The stream surveys provide fish habitat information as well as channel information such as amount of large woody material (LWD), substrate composition, and pool complexity and frequency. Stream channel information is summarized in Table 6.

Table 6. Stream Channel Summary

Stream Name	Description of Stream Reaches Surveyed	LWD (pieces/100m)	Substrate (Percent Wetted Area)						
			Silt & Organic	Sand	Gravel	Cobble	Boulder	Bedrock	Erosion %
Box Creek	Bridge to Diversion (3 reaches)	8.1	7	6	23	38	16	9	27
Crowfoot Creek	Conf w/Big Butte to 1.8 km (1 reach)	2.5	1	3	19	35	18	24	9.4
Dog Creek	Conf w/ Big Butte to 6.6 km (5 reaches)	10.2	13	6	16	32	23	10	22

In 1972, the BLM conducted stream surveys on Big Butte Creek, Clark Creek and their tributaries, McNeil Creek, Dog Creek, Vine Creek, and Box Creek. Habitat features that can be compared with ODFW 1996 surveys are: pool quality, gravel abundance, temperature, and stream shade. Stream surveys conducted on these three streams by ODFW and BLM give a general condition assessment (Table 7).

Table 7. Condition Rating of Key Habitat Elements

STREAM	Pool Quality		Spawning Gravel		Stream Shade		Temperature	
	1972	1996	1972	1996	1972	1996	1972	1996
Big Butte Creek	Excl	Unkn	Good	Unkn	Poor	Unkn	Good	Poor
Clark Creek	Good	Unkn	Fair	Unkn	Fair	Unkn	Fair	Unkn
N.Fork Clark Cr.	Good	Unkn	Excl	Unkn	Excl	Unkn	Excl	Unkn
S.Fork Clark Cr.	Excl	Unkn	Fair	Unkn	Good	Unkn	Excl	Unkn
Trib. to Clark Cr.	Good	Unkn	Good	Unkn	Good	Unkn	Excl	Unkn
McNeil Creek	Fair	Unkn	Fair	Unkn	Poor	Unkn	Poor	Unkn
Dog Creek	Good	Poor	Fair	Fair	Good	Good	Poor	Poor
Box Creek	Fair	Poor	Good	Fair	Fair	Fair	Good	Excl
Crowfoot Creek	Unkn	Fair	Unkn	Fair	Unkn	Poor	Unkn	Excl
Vine Creek	Fair	Unkn	Fair	Unkn	Excl	Unkn	Poor	Unkn

Note: Unkn=Unknown, Excl=Excellent

In general, habitat features found to be in an impaired condition within this watershed are pool quality, quality and quantity of spawning habitat, large wood volume, and temperature. The major identified causes for degradation of aquatic habitat were rural development, logging, roads, and grazing.

Aquatic Wildlife and Habitat

Macroinvertebrates

In 1992, 1993, 1996, and 1997 the BLM contracted macroinvertebrate sampling on Big Butte Creek, Camp Creek, Box Creek, Clark Creek, Dog Creek, and Crowfoot Creek within the WAU. Aquatic macroinvertebrates can be good indicators of stream habitat quality. The presence or absence of certain taxa can provide information about a stream's condition and any changes in the habitat. Data summaries were available for the following years and streams:

1993

Clark Creek: This site contains a moderate to high taxa (species) richness. Macroinvertebrate densities were also high in all three habitat types (erosional, margin, detritus). Cold water biota were present in Clark Creek in "high richness and abundance", indicating that water temperatures are cool/cold year round. The shredder community here is well developed, which indicates that retention capabilities of the channel are excellent. Both caddisfly and stonefly shredder populations within the community were well developed, with few negative indicator species present. A snail of the family *Hydrobiidae* was present at two of the sites, but was not one of the pebble snails (*Fluminicola* sp.) which are a Survey and Manage species of concern. No sensitive, threatened, or endangered species were found at this site.

1996

Big Butte Creek #3: This site contains a high abundance of macroinvertebrates, a low richness of total taxa, and a large percentage (45%) of *Hydrobiidae*. Both positive and negative indicator species were generally scarce and populations were poorly developed. Intolerant mayflies were rare, and intolerant stoneflies and caddisflies were absent. No threatened or endangered species were found at this site. Limitations for macroinvertebrates at this site include high amounts of sediment which limits crevice habitat, and high seasonal scour.

Big Butte Creek #5: This site contains an extremely low abundance of macroinvertebrates, a low richness of taxa, and a large percentage of *Serratella* sp. and *Chironomidae*. Positive indicator species were generally scarce and the associated communities were poorly developed. Intolerant mayflies and caddisflies were absent. Intolerant stoneflies and xylophages were absent from the detritus. No sensitive, threatened, or endangered species were found at this site. Limiting factors for macroinvertebrates at this site include high amounts of sediment which limits crevice habitat, and high seasonal scour.

Box Creek: This site had different species distribution between the three habitat areas. The erosional habitat contains a low abundance of macroinvertebrates, a moderate to low richness of taxa, and no dominant taxa. Positive indicators were somewhat sparse and the associated community was poorly developed with a low richness of predators, scrapers, and shredders. Intolerant mayflies were rare. Negative indicators were also largely absent, except for a moderate percentage of collector species. The margin habitat contains a low abundance of macroinvertebrates, low richness of total taxa, low to moderate richness of taxa richness, and a dominant percentage of *Epeorus* sp. Positive indicators were moderately rich and the associated community moderately developed. The detritus habitat

contains a high to moderate abundance of macroinvertebrates, a moderate richness of taxa, and a large percentage of *Chironomidae*. Positive indicator species were moderately rich, and the associated community moderately developed. No sensitive, threatened, or endangered species were found at this site. Limitations include high amounts of sediment which limits crevice habitat, and channel scour to clay layer in places.

Crowfoot Creek: This site contains an extremely low abundance of macroinvertebrates, low richness of taxa, and a large percentage of *Lymnaedia* and *Chironomidae*. Positive indicator species were rare and populations were poorly developed. No sensitive, threatened, or endangered species were found at this site. Limitations include stream scoured to bedrock in places, low canopy closure, high stream exposure, and low summertime flows.

Dog Creek: This site contains a low abundance of macroinvertebrates, a low to moderate richness of taxa, and a large percentage of *Ironodes* sp., *Maruina* sp., and *Zapada cinctipes*. Positive species indicators were generally scarce and the associated community poorly developed. No sensitive, threatened, or endangered species were found at this site. Limitations here include high amounts of sediment.

Aquatic Mollusks

The current distribution of aquatic mollusks within the Lower Big Butte WAU is unknown. A report prepared for USDA Forest Service by Deixis Consultants indicates there are no species of special concern thought to occur within the WAU (Frest & Johannes).

Fish Species and Habitat

Life History

Chinook salmon, coho salmon, steelhead/rainbow trout, cutthroat trout, Pacific lamprey, and various sculpin are native species which utilize the Lower Big Butte watershed. The general life history patterns vary among these fish species. Little is known about the life history strategies and distribution of Pacific lamprey and sculpin. Rainbow and cutthroat trout are resident salmonid species which spend their entire lives in the stream system. Chinook, coho, and steelhead are anadromous salmonids, which migrate to sea and back to spawn in their natal streams. The following describes their life history strategies (ODFW, 1994):

Chinook Salmon

Adult spring chinook salmon enter the Rogue River from March through June. These fish typically are bound for the upper Rogue River and its tributaries and hold in areas between Gold Rey Dam and Cole Rivers Hatchery. Spring chinook spawn from September through mid-November.

Adult fall chinook enter the Rogue River from July through October. Spawning takes place from October through late January, and peaks in the mainstem Rogue River in mid-November. Approximately 10 percent of the population spawns above Gold Rey Dam, with spawning densities the highest in the middle Rogue River.

Chinook salmon eggs incubate in the gravel for approximately four months from mid-October through mid-March. Juvenile chinook salmon rear in Big Butte Creek and the mainstem Rogue River, then migrate downstream and enter the ocean in August and September. Once in the ocean, smolts migrate south to rear off the Southern Oregon/Northern California coast, and return to spawn in two to six years.

Coho Salmon

Adult coho salmon enter the Rogue River in September and migrate upstream to spawn as

winter rains raise water levels in tributary streams. Spawning takes place from November through January. Coho salmon eggs incubate in the gravel for approximately four months and emerge in April. Coho rear in freshwater for one year, with a small percentage of the population rearing for two years in fresh water. Juvenile coho over-winter in large, deep pools with complex woody cover, backwaters, alcoves, and side channels which provide refugia during high winter flow months. Juveniles migrate to the ocean from mid-May through mid-July. Most Rogue River coho salmon migrate south and rear off the Southern Oregon/Northern California coast, returning to spawn in two years.

Steelhead Trout

Summer steelhead enter the Rogue River from May through October. Steelhead spawn primarily in tributaries like Big Butte Creek and its tributaries, although many may use the mainstem Rogue River when access to their natal tributary is blocked by a barrier or low winter flow levels.

Summer steelhead spawn from December through March with the peak occurring in mid-January. Fry emerge from the gravel between April and May, then migrate to the mainstem Rogue River in May and June when their natal waters become too warm and dry up. Smolts migrate from April through June with a peak in early May. Most summer steelhead smolt in freshwater at age 2, but can smolt from ages 1 through 4 (Everest).

Summer steelhead are believed to rear in the ocean off the Southern Oregon/Northern California coast for 2 years, though time in the ocean can vary from 1 to 3 years. A large portion (approximately 97 %) of summer steelhead in the Rogue River make a false spawning migration known as the "half-pounder" run. Fish that exhibit this life history pattern enter the river two to four months after migration to the ocean, remain in freshwater over the winter, and return to the ocean the following spring. These fish are generally 16 inches in length (Everest).

Winter steelhead trout enter the Rogue River from November through March. Winter steelhead spawn in Big Butte Creek and its tributaries. Steelhead fry emerge from the gravel between April through August with the peak between late May and early June. Most winter steelhead rear in freshwater for two years before migrating to the ocean.

Most winter steelhead are believed to migrate south off the Southern Oregon/Northern California coast for one to three years. Approximately 30 percent of the wild winter steelhead in the Rogue River make a false spawning migration.

Fish Trapping

In 1998 and 1999, the ODFW and the BLM completed a cooperative smolt trapping project on Big Butte Creek and other Rogue basin streams. Through a mark and recapture procedure, the production of smolts, their timing during outmigration, and the average size of the fish were estimated. (Tables 13 and 14).

Table 13. Coho smolt production estimates for Big Butte Creek.

Stream	Dates Trapped	# Days Trapped	# Coho Captured	# Coho Marked	# Coho Recaptured	Trapping Efficiency	Population Estimate	95% CI (range)
Big Butte (1998)	3/9-6/27	92	874	789	168	21%	4,103	3,448-4,758
Big Butte (1999)	3/16-6/27	104	2,316	1,743	321	18%	12,587	11,204-13,969

ODFW, 1998 & 1999

Table 14. Steelhead smolt production estimates for Big Butte Creek.

Stream	Dates Trapped	# Days Trapped	# steelhead Captured	# steelhead Marked	# steelhead Recaptured	Trapping Efficiency	Population Estimate	95% CI (range)
Big Butte (1998)	3/9-6/27	92	1,266	1,070	107	10%	12,660	10,266-15,054
Big Butte (1999)	3/16-6/27	104	994	930	56	6%	16,567	11,951-21,183

ODFW, 1998 & 1999

Distribution

Approximately 47 miles of streams within the Lower Big Butte watershed are fish bearing. Steelhead trout occupy approximately 27 stream miles, chinook salmon occupy 13 miles, coho salmon occupy 24 miles, and cutthroat occupy 47 miles.

Coho salmon and steelhead trout both have an extensive distribution pattern throughout the Lower Big Butte Watershed. Coho utilize most major tributaries within the watershed. Steelhead utilize most major tributaries within the watershed including McNeil Creek, Vine Creek, Clark Creek, Dog Creek, Crowfoot Creek, and Box Creek. Coho and steelhead migrate into smaller headwater tributaries, with steelhead accessing high gradient areas unobtainable to coho. However, both coho and steelhead spawn in the lower gradient or flat area portions of the high gradient streams. Water flows during the year also contribute to the extent that fish will migrate within a watershed.

Fall and spring chinook utilize the lower reaches of Big Butte Creek near the mouth. Chinook have been documented spawning throughout the lower portions of Big Butte Creek. Chinook utilize the lower gradient portions of mainstem streams, and juveniles generally migrate out of the watershed soon after emerging from the gravel.

There is limited information about the full distribution of resident salmonid species within the Lower Big Butte Creek watershed. Cutthroat and rainbow trout have a wide distribution throughout the Rogue River basin. Within the watershed, they occupy most major streams and tributaries, and are also found in smaller headwater tributaries which are inaccessible to anadromous fish.

Pacific lamprey and various sculpin species are also present within this watershed. Limited information is known about the distribution of these species. It is likely that Pacific lamprey overlap steelhead trout distribution, except for steep gradient tributaries or streams with fish passage barriers. Sculpin species would be expected to have a fairly wide distribution in the Lower Big Butte Creek Watershed.

Fish Passage

Numerous fish passage barriers and limiting structures occur within this watershed. Natural barriers include waterfalls, bedrock chutes, log jams, and stream gradient barriers. Man-made barriers and limiting structures include instream water diversions, diversion canals, irrigation pumps, culverts and diversion dams (Tables 15 and 16).

Table 15. Natural structures within Lower Big Butte watershed.

Stream	Stream Mile	Structure	Size	Barrier	Comments
Big Butte Creek	9.75	log jam	unkn	No	None
Vine Creek	.25	log jam	210 yds	No	None
Vine Creek	.30	log jam	110 yds.	No	None
Clark Creek	.25	boulder falls	8 foot	Possible	None
Clark Creek	1.25	3 log jams	2-4' falls	Possible	None
Clark Creek	1.75	waterfall	50 foot	Yes	None
Clark Creek	2.0	bedrock falls	9 foot	Possible	None
Clark Creek	3.0	log jam	unkn	Unkn	None
N Fk. Clark Cr.	mouth	debris falls	4 foot	No	None
N Fk. Clark Cr.	.50-1.5	7 log jams	6 foot fall	Possible	None
S Fk. Clark Cr.	.50	falls	3 foot	No	None
S Fk. Clark Cr.	1.0-4.0	falls	10'-30'	Yes	None
S Fk. Clark Cr.	2.25	log jam	350 yd	Yes	None
Trib. to Clark Cr.	.25-.75	3 log jams	6'x4'x2'	No	None
Trib. to Clark Cr.	.25	bedrock fall	15 foot	Yes	None
Neil Creek	1.5	log jam	unkn	Yes	None
Dog Creek	.50	bedrock falls	12 foot	Possible	Falls is sloping
Dog Creek	.75	2 log jams	unkn	Unkn	None
Dog Creek	1.5	falls	5 foot	Possible	None
Box Creek	1.25	bedrock falls	15 foot	Yes	Falls is sloping
Box Creek	1.50	2-6 log jams	unkn	Unkn	None
Box Creek	2.25	bedrock falls	45 foot	Yes	None

Table 16. Man-made structures in the Lower Big Butte Creek watershed.

Stream	Stream Mile	Structure	Size / #	Limiting?	Comments
Big Butte Creek	.72	irrigation dam	unkn	No	None
Big Butte Creek	2.0	irrigation diversion and pumps	20 sites	Possible	None
Big Butte Creek	13.0	irrigation canal	unkn	unkn	None
Vine Creek	.30	culvert	8 ft drop	Yes	lg. pond created in culvert
Clark Creek	1.0	irrigation canal	unkn	Yes	None
Clark Creek	4.25	concrete weir	unkn	Possible	irrigation weir
Clark Creek	5.25	culvert	4 ft drop	Possible	None
Neil Creek	1.50-2.75	irrigation pumps, pipes, and diversions	2-5	Yes	None
Neil Creek	2.50	concrete dam	unkwn	Yes	None
Dog Creek	1.75	concrete irrig. weir	8 ft fall	Yes	barrier to fish
Dog Creek	2.0	concrete irrig. weir	unkn	Yes	diversion, possible barrier
Box Creek	.50	diversion dam	unkn	Yes	None
Box Creek	.75	diversion dam	unkn	Yes	None
McNeil Creek	mouth	high stream temp.	to mile 4.0	Yes	cattle / logging impacts

BLM, 1972, 1996

Fish Hatcheries

Two fish hatcheries are located within the Rogue Basin: Cole Rivers Hatchery and the Butte Falls Hatchery. Cole Rivers Hatchery began operation in 1975 and was built to mitigate for fish loss of anadromous salmonid habitat above Lost Creek Dam. The ODFW has had an active fish stocking program in Big Butte Creek. Legal sized (>8") and fingerling rainbow trout are stocked during spring months near the town of Butte Falls to support and promote recreational angling.

Introduced Fish

Some private landowners within the WAU have water impoundments such as ponds and reservoirs which have been stocked with introduced warm water species such as largemouth bass and sunfish, or with non-native salmonids such as brown and brook trout. In some cases these impoundments intercept streams which contain populations of coho salmon, steelhead/rainbow, or cutthroat trout. Escapement of introduced fish from these impoundments into the stream systems is known to occur, as evidenced by trap data.

Historical Conditions

Prior to Euro-American influences, headwater streams in the Lower Big Butte Creek watershed likely had large amounts of large wood material within the stream channel. This watershed provided channel structure, fish spawning and rearing habitat, and pool complexity. Streams in the valley bottoms most likely had greater sinuosities, side channels, lower

width/depth ratios, and log jams. The abundance of beavers was greater in the watershed prior to the arrival of fur trappers in the 1830s. Beavers are important to stream habitat by creating pool habitat and dams which add large wood material to the stream, thus trapping and storing gravels and providing cover used by spawning and rearing fish.

Since the arrival of Euro-Americans, stream channels within the watershed changed. Activities such as logging, grazing, fur trapping, agriculture, residential development, and road building greatly influenced stream channels. Fur trapping in the 1830s - 40s resulted in a decrease in beaver populations and the loss of beaver dams.

Cattle and sheep were also introduced in this watershed, although the exact time is not known. Cattle tended to congregate along stream edges which likely caused bank degradation and impacts to riparian vegetation. Historically, cattle most likely congregated in meadow areas where soil became compacted and native vegetation was trampled.

Logging and land clearing for agricultural and residential use resulted in the removal of large wood in some areas. Areas that were cleared reduced the amount of large wood recruitment sources for in-stream structure from the adjacent riparian area.

Roads were constructed during this time to create access for homesites, logging areas, and access to lands. Construction of roads near streams likely increased the sediment rate into the streams and altered the timing and variability of base and peak flows within these areas.

Historically, anadromous fish populations flourished in the Rogue River Basin. Chinook salmon, coho salmon, winter and summer steelhead trout, and Pacific lamprey were well distributed throughout the watershed and more abundant than current populations (Table 19).

Table 19. Fish population counts over Gold Rey Dam (1942-1960).

Run Year	Spring Chinook	Fall Chinook	Coho Salmon	Summer Steelhead	Winter Steelhead
1942	41,779	1,670	4,608	7,387	
1943	36,136	1,611	3,290	5,648	15,314
1944	30,632	1,223	3,230	5,530	13,380
1945	31,996	1,641	1,907	7,302	16,083
1946	28,374	1,691	3,840	4,448	8,729
1947	33,637	1,176	5,340	3,221	9,653
1948	26,979	757	1,764	2,133	8,605
1949	18,810	1,233	9,440	3,618	8,052
1950	15,530	1,204	2,007	4,583	8,684
1951	19,443	1,489	2,738	3,262	5,744
1952	15,888	2,558	320	4,200	10,648
1953	31,465	2,083	1,453	3,831	10,945
1954	24,704	955	2,138	2,222	7,228
1955	15,714	836	480	1,703	5,239
1956	28,068	1,884	421	2,753	8,775
1957	17,710	1,060	1,075	1,323	4,508
1958	15,016	700	732	1,293	3,855
1959	13,972	735	371	865	4,550
1960	24,374	1,843	1,851	2,034	6,901

Stream Channel

Stream channel conditions reflect the historic land use practices of logging, land clearing, grazing, and road building, as well as natural occurrences such as heavy rainfall and debris dams releasing in channels. The amount of large wood greater than 24 inches diameter and 50 feet in length in the stream systems are low according to NMFS standards (less than 25 pieces/mile). Percent of channels showing active bank erosion is high, pool quality is poor to fair, and spawning gravels are fair. All of these indicators point to a lack of riparian vegetation which provides bank stability and large wood recruitment. In addition, changes in peak flows have contributed to erosion of banks which are already destabilized by a lack of deep-rooted vegetation.

Stream Temperature

Several streams within the WAU are listed by DEQ as "water quality limited" due to temperature, including the mainstem of Big Butte Creek and Dog Creek. Temperatures are affected by lack of stream shading, high width/depth ratios, and low flows caused by irrigation

withdrawals.

Flows

Stream flows within the WAU have been altered by logging, roads, and irrigation withdrawals. Peak flows are higher than would normally be expected and summer low flows are lower. High flows can contribute to bank erosion, sedimentation, and movement of large wood out of the system. Low flows affect stream temperature and movement of fish within the system.

Sediment

Although the percent of fines (silt, sand, and organics) on surveyed streams was found to be relatively low, macroinvertebrate surveys indicate that sediment is a limiting factor in the watershed. Intolerant taxa were rare or absent at most sites, indicating high sediment levels. Sediment is contributed through roads, slides, bank erosion, and ground-disturbing activities such as timber harvest.

Fish

Anadromous fish population numbers have declined over the past twenty-five years in the Rogue River basin. This can be partly attributed to land management practices which have impacted aquatic habitat, including removing large wood from streams and clearing of riparian vegetation. Increased timber harvest activities and high road densities contribute sediment to the streams, impacting juvenile and resident fish by reducing the numbers of macroinvertebrate prey species available for food. Spawning adults are also impacted by sediment which chokes spawning gravels. Water withdrawals and human-made barriers have created additional impacts by reducing the amount of suitable habitat available to fish and interrupting connectivity of aquatic systems.

Management Recommendations

Objective: Increase stream bank stability

- Identify stream reaches which are experiencing active bank erosion.
- Stabilize banks through silvicultural treatments such as planting native riparian hardwood species (alder, willow, ash, cottonwood) and encouraging the development of late-seral characteristics in Riparian Reserves.
- Exclude cattle from areas where the stream banks are being degraded by cattle crossings.

Objective: Increase stream channel complexity.

- Encourage the development of late-seral characteristics in Riparian Reserves to provide future recruitment of large woody debris (LWD). In areas where the LWD recruitment potential is low, consider placement of log structures to provide habitat complexity and retain spawning gravels.
- In areas where the stream has been channelized, encourage development of side channels and meanders by reconnecting the stream with its former floodplain.

Objective: Reduce summer stream temperatures.

- Encourage the development of late-seral characteristics in Riparian Reserves to provide increased stream shading.

- Exclude cattle from areas where riparian vegetation can be shown to be over-utilized by cattle.

- Explore opportunities with private landowners and the Eagle Point Irrigation District to increase summer flows by implementing alternative irrigation methods such as drip systems, or by releasing stored water from impoundments.

Objective: Reduce sedimentation of stream substrate.

- See recommendations under Soils.

Objective: Restore aquatic habitat connectivity.

- Identify man-made passage barriers such as culverts and irrigation diversions.

- Replace culverts on fish-bearing streams with bottomless arches or similar structures.

- Explore opportunities with private landowners and the irrigation district to remove unused or nonfunctional diversions, or to replace utilized diversions with pumps or infiltration galleries.

Objective: Monitor populations of T&E fish species.

- Continue smolt trapping project on lower Big Butte Creek.

- Periodic (5 years) monitoring by snorkeling or electrofishing.

- Monitor aquatic habitat restoration projects for effectiveness.

Consultation Report for Effects Determinations on Listed and Proposed Fish Species and Proposed or Designated Critical Habitat

I. Project Information

June 13, 2001

A. General

Project Name:	Lower Big Butte Landscape Projects
BLM District and Resource Area:	Medford District, Butte Falls R.A.
Project Location (6th Field HUC sub-watersheds):	Big Butte Creek Lower, Big Butte Creek Middle, McNeil Creek, Big Butte Creek N. Fork, Little Butte-Lick
Project Location (5th Field HUC watersheds):	Big Butte Creek; Little Butte Creek
Watershed Analyses Names and Dates Completed:	Lower Big Butte WA, September 1999; Central Big Butte Creek WA, 1995; Little Butte Creek WA, November 1997
NEPA Document ID Number:	OR-110-016
Fish Species Considered:	Southern Oregon/Northern California Coho Salmon, SONC Critical Habitat, Essential Fish Habitat
Effects Determination:	May Affect, Not Likely to Adversely Affect (NLAA)

B. Background

The following information for the Lower Big Butte Landscape Projects serves to clearly document the logic tracking and links of the project with Watershed Analysis (WA), the Aquatic Conservation Strategy (ACS), and National Marine Fisheries Service's (NMFS) March 18, 1997 plan-level Biological Opinion (BO). The Lower Big Butte Landscape Projects are covered under a landscape type Environmental Assessment (EA).

The proposed Lower Big Butte timber sales and fuel treatments are included within the landscape EA. Timber harvest and fuel treatments all occur within two fifth field watersheds: Big Butte Creek and Little Butte Creek; and five sixth field watersheds: Big Butte Creek Lower, Big Butte Creek Middle, McNeil Creek, Big Butte Creek N. Fork, and Little Butte-Lick. Analysis of the effects of some of these fuel treatments were included in this ACS consistency determination. These include the slash buster treatments and the treatments within Riparian Reserves. The other

types of fuels treatments, including understory thinning using hand treatments, underburn, grassland burn, and slash/pile/burn treatments, are covered under the August 15, 1997 Programmatic Biological Opinion (BO) for ESA Section 7 consultation.

Also included in the EA are road decommissioning, road renovation, and fish passage barrier removal within the Clark Creek sixth field watershed. Clark Creek has been designated as a deferred watershed due to high cumulative effects from past timber harvest and road building activities. The proposed actions in Clark Creek will occur separately from the timber harvest and fuel treatments. For this reason, the beneficial effects of road decommissioning and fish passage barrier removal in the Clark Creek watershed will not be counted as mitigation for the effects of road construction associated with the proposed timber harvest. The Clark Creek projects are not included in this consultation document, but will fall under the Programmatic BO for ESA Section 7 consultation coverage.

For the purposes of this consultation, Essential Fish Habitat is identical to coho Critical Habitat and includes all streams in this project area which are currently or historically accessible to anadromous fish.

The Preferred Alternative chosen for this consultation is Alternative 3 in the Lower Big Butte EA.

C. Summary of the Proposed Action for Big Butte Creek Watershed

Lower Big Butte Timber Sale; Lower Big Butte Fuels Treatments
HUC 5: Big Butte Creek

HUC 6	Planned Activities Outside Riparian Reserves (Acres or Miles)	Planned Activities Within Riparian Reserves (Acres or Miles)

Harvest Information: **Lower Big Butte HUC 6**	***Density Management*** 20 acres Tractor ***Select Cut*** 10 acres Cable	No timber harvest activity in Riparian Reserves
Middle Big Butte HUC 6	***Density Management*** 420 acres Total: 230 acres Tractor 30 acres Cable 160 acres Helicopter ***Select Cut*** 100 acres Total: 50 acres Tractor 50 acres Helicopter ***Regeneration Harvest*** 30 acres Tractor	No timber harvest activity in Riparian Reserves
McNeil Creek HUC 6	***Density Management*** 250 acres Total: 50 acres Tractor 30 acres Cable 170 acres Helicopter ***Select Cut*** 20 acres Helicopter ***Understory Thin*** 20 acres Tractor	No timber harvest activity in Riparian Reserves
Big Butte Creek N. Fork HUC 6	***Density Management*** 30 acres Helicopter	No timber harvest activity in Riparian Reserves

Road Information: **Lower Big Butte HUC 6** **Middle Big Butte HUC 6** **McNeil Creek HUC 6**	***Improvement*** .53 miles of road ***Temporary Block*** .5 miles of road ***Full Decommission*** .13 miles of road ***Improvement*** 1.9 miles of road ***Renovation*** 9.62 miles of road ***Temporary Block*** 8.67 miles of road ***Partial Decommission*** .59 miles of road ***Full Decommission*** .92 miles of road ***Temporary Road Construction*** .29 miles of road ***Permanent Road Construction*** .29 miles of road ***Improvement*** 1.5 miles of road ***Renovation*** 12.1 miles of road ***Temporary Block*** 3.54 miles of road ***Temporary Road Construction*** .45 miles of road ***Permanent Road Construction*** .22 miles of road	
Fuels Treatments: **Lower Big Butte HUC 6** **Middle Big Butte HUC 6** **McNeil Creek HUC 6**	***Density Management Slash Buster*** 100 acres ***Slash Buster/Burn*** 240 acres ***Density Management Slash Buster*** 50 acres ***Slash Buster/Burn*** 940 acres ***Density Management Slash Buster*** 260 acres ***Slash Buster/Burn*** 280 acres	***Understory Thinning in Riparian Reserves using hand-held equipment*** 30 acres ***Understory Thinning in Riparian Reserves using hand-held equipment*** 40 acres ***Grassland Burn in Poverty Flat ACEC*** 12 acres

HUC 5: Little Butte Creek

HUC 6	Planned Activities Outside Riparian Reserves (Acres or Miles)	Planned Activities Within Riparian Reserves (Acres or Miles)
Harvest Information: Little Butte-Lick HUC 6	***Density Management*** **30 acres Tractor**	No timber harvest activity in Riparian Reserves

II. Consistency Evaluation

A. Evaluation of Consistency with the Northwest Forest Plan Standards and Guidelines

These projects are located in the Matrix, Administratively Withdrawn, and Riparian Reserve Land Use Allocations (LUA); therefore the S&G's for these LUA's would apply. The following S&G's are required by the NFP:

1). Watershed analysis (WA) must be completed before initiating actions within the Riparian Reserves (B-20). The Lower Big Butte, Central Big Butte Creek, and Little Butte Creek WAs have been completed.

2). Riparian Reserves are specified for five categories of streams or water bodies (C-30). The Riparian Reserve widths are established as 170 feet on each side (340' total) for non-fish bearing streams, and 340 feet on each side (680' total) for fish bearing streams in the project area.

3). S&G RF-2a (C-32) states that ACS objectives are to be met by "minimizing road and landing locations in Riparian Reserves." No roads or landings would be constructed in the Riparian Reserves (EA pg. 23, D-13.)

B. Evaluation of Consistency with Aquatic Conservation Strategy Objective Components

Four components of the ACS are integral in both the Northwest Forest Plan (NFP, February 1994) and Resource Management Plan (RMP, June 1995) to assist the BLM in developing and implementing projects that are consistent with ACS objectives. These four components are: 1. **Riparian Reserves**; 2. **Key Watersheds**; 3. **Watershed Analysis**; and 4. **Watershed Restoration**. The following narrative addresses how each of these components relates to both the proposed action and the fifth field watershed.

1. RIPARIAN RESERVES

The Lower Big Butte, Central Big Butte Creek, and Little Butte Creek Watershed Analyses used the interim Riparian Reserve widths established in the NFP. At the project level Riparian Reserve widths are established as 170 feet on each side (340' total) for non-fish bearing streams, and 340 feet on each side (680' total) for fish bearing streams.

Planned activities in Big Butte Creek Watershed Riparian Reserves

No commercial timber harvest, new roads or skid road building will occur within the Riparian Reserves for the Lower Big Butte Landscape Projects. Approximately 70 acres of understory thinning for fire hazard reduction will be done within the Riparian Reserves. Fuels treatments (underburning) will not be implemented in Riparian Reserves on perennial streams; however, slash piles created by the proposed thinning in Riparian Reserves on Crowfoot Creek and Box Creek will be burned. Low-intensity underburn fires may be allowed to enter Riparian Reserves on some intermittent streams where the riparian vegetation consists of fire-adapted species such as oak, pine, and ceanothus. Approximately 12 acres within the Poverty Flat ACEC is planned for a grassland burn to reduce the spread of noxious weeds and improve the vigor of native vegetation. No mechanical fuel treatments (e.g. slash buster) will occur, and no fire lines will be built or fire retardant chemicals used in the Riparian Reserves. Slash-buster equipment will be required to use only designated crossings on intermittent streams to minimize impacts to the channel. Fuels treatments are expected to occur over a two to four year time period during the fall and spring, depending upon air quality restrictions. Road improvement and decommissioning are also planned as part of this project. Road decommissioning would provide and restore long term benefits to the stream corridor which would promote an increase in canopy closure and riparian vegetation, decrease in sediment delivery, and improve the functioning condition of the Riparian Reserve. A total of .47 miles of road within Riparian Reserves are planned for full or partial decommissioning, 3.83 miles will be blocked, and 6.62 miles will be improved or renovated for this project.

2. KEY WATERSHEDS

The project area is not located within a Key Watershed.

3. WATERSHED ANALYSIS

The proposed landscape projects occur within the Lower Big Butte, Middle Big Butte, McNeil Creek, Big Butte Creek N. Fork, and Little Butte-Lick sub-watersheds. These sub-watersheds are analyzed as a part of the Lower Big Butte, Central Big Butte Creek, and Little Butte Creek Watershed Analyses. The findings indicate that the project area has an extreme fire hazard rating as a result of fire suppression which has led to a buildup of fuels. Recommendations support the reduction of stand densities and ladder fuels to reduce the risk of a high-intensity stand replacement fire. The WA findings and recommendations also support encouraging the development of late-seral characterisitics in Riparian Reserves to provide increased stream shading, bank stabilization, and future recruitment of large woody debris through silvicultural and fuels treatment practices (Lower Big Butte WA, pp. 54-56).

4. WATERSHED RESTORATION

Restoration recommendations are identified in the Lower Big Butte Creek WA (pp. 52-59).

Short Term Active Restoration (to be completed within the next 5 years)

The following restoration projects are proposed to be completed within the next 5 years and are consistent with recommendations made within the Lower Big Butte Creek Watershed Analysis. Analysis of the effects of these projects is included in the Lower Big Butte EA. The projects are planned to be funded through the proposed timber sales or through the Jobs-In-The-Woods program.

Road Decommissioning	3.04 miles
Road Improvement	7.67 miles
Fish Passage Barrier Removal (culvert and log stringer bridge)	2 sites
Vegetation restoration projects/fuels treatments (4280 acres total)	410 acres density management slash buster (understory) 1460 acres slash buster/burn (brush & oak woodlands) 420 acres underburn (conifer & oak woodlands) 1270 acres understory thin (conifer & oak woodlands) 410 acres grassland burn 310 acres slash/handpile/burn (brush & oak woodlands)

C. Evaluation of Consistency with NEPA Documentation

The Environmental Analysis was completed consistent with NEPA documentation regulations. Within the EA a "no action" alternative, and three "action" alternatives were analyzed through the interdisciplinary team process to determine the effects of each action on the riparian and aquatic ecosystems. Key issues included were analyzed and listed within the EA. Biological and physical elements were analyzed to determine the short and long term effects to the aquatic ecosystem and ensure consistency with ACS objectives. ACS consistency and matrix checklists were completed with input from the interdisciplinary team.

D. Evaluation of Consistency with NMFS' March 18, 1997 Plan-level BO

Conservation Recommendations

The WAs completed for the Lower Big Butte, Central Big Butte, and Little Butte Creek watersheds included assessments of the aquatic ecosystem which address salmonid conservation as a main issue. This is consistent with the RMP BO Conservation Recommendation 3, page 47. The completed WA also included recommendations for restoration projects, including projects that promote long-term recovery such as road decommissioning. This is consistent with the RMP BO Conservation Recommendations 5 and 6. The Transportation Management Objectives were completed for the sale area which prioritized roads that were identified for restoration opportunities. Based on the analysis of consistency with ACS Objective 5 contained in this document, Conservation Recommendation 13 is also met. No other Conservation Recommendations specifically apply to this proposed action.

Reasonable and Prudent Measures

During WA and the landscape project design processes the interdisciplinary team used criteria in the NFP Record Of Decision (ROD) to ensure the proposed actions are fully consistent with applicable standards and guidelines and ACS objectives. This is consistent with Reasonable and Prudent Measure 1. The proposed project has been reviewed by the Level 1 Team. This is consistent with Reasonable and Prudent Measure 2. Based on the Aquatic Conservation Strategy evaluation contained in this document, the proposed actions associated with the landscape projects may result in short term, localized adverse affects, with the project ultimately providing some measure of long-term ecosystem recovery. This is consistent with Reasonable and Prudent Measure 4. All road related work would be completed during the dry season and utilize applicable Best Management Practices. This is consistent with Reasonable and Prudent Measures 5 and 6. A total of .51 miles of new permanent roads would be constructed. Any temporary roads constructed for project transportation would be decommissioned following the project, and their location would be limited to ridgetops to minimize adverse effects. This is consistent with Reasonable and Prudent Measure 8. No other Conservation Recommendations specifically apply to this proposed action.

Terms and Conditions

All temporary road construction under the proposed action is limited to stable areas or ridgetops, and would be decommissioned following the completion of the project. This is consistent with the Term and Condition 8.b. All road renovation and decommissioning activities that are identified as mitigation are included under the same timber sale contract. This is consistent with Term and Condition 8.e.ii. No other Terms and Conditions specifically apply to this proposed action.

E. Evaluation of Consistency with Aquatic Conservation Strategy Objectives

In the following ACS consistency evaluation discussion, a list of factors and indicators from the NMFS checklist (i.e. NMFS Matrix of Pathways and Indicators) has been provided under each ACS objective. There are different factors and indicators that relate to each of the nine ACS objectives and many of these relate to and address more than one ACS objective. By including the factors and indicators in the ACS objective consistency discussion, a common link and logic track is developed between ACS consistency and the effects determination of the project on federally listed or proposed fish species.

When discussing effects in the individual analysis of ACS objectives, "long term" is used in the context of ACS, meaning a period of time defined as "decades, possibly more than a century" (NFP ROD, p. B-9), unless otherwise described.

ACS OBJECTIVE 1 - *Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.*

Summary

Based on design features, this project should maintain or restore the elements outlined in ACS Objective 1. Fuels treatments within Riparian Reserves are designed to restore the health of riparian vegetation by reducing densities that have resulted in suppressed growth and high risk of catastrophic fire. Road densities within the project area will be reduced overall by approximately 2.5 miles. No indicator is expected to be degraded at either the site level or the fifth field watershed over the long term. Therefore, it is concluded this project is consistent with ACS Objective 1.

Relevant Indicators from NMFS Matrix Used to Assist in the Consistency Determination

Off-channel Habitat	*Disturbance history*
Refugia	*Road density and location*
Riparian Reserves	*Floodplain connectivity*

Discussion of Indicators

<u>Off-channel Habitat</u>

Environmental Baseline:

(All Sixth Fields): AT RISK. Very little information is currently available quantifying the amount of off-channel habitat within the watershed. However, in similar watersheds (size and disturbance history) where aquatic habitat has been surveyed, off-channel habitats are not common features and have been altered from historic conditions.

Sixth Field Effect:

(All Sixth Fields): MAINTAIN. If any off-channel areas do exist they would be protected as part of the Riparian Reserve. Based on the project design features from the EA, it is expected that

any off-channel habitat that does exist will be maintained.

Fifth Field Effects:

(All Fifth Fields): MAINTAIN. Based on anticipated site specific levels of effects analyzed above, it is expected that any off-channel habitat would be maintained at the fifth-field scale.

Refugia

Environmental Baseline:

(All Sixth Fields): AT RISK. There is currently no information regarding refugia (stream reaches which provide exceptional spawning or rearing habitat) in the Lower Big Butte sub-watershed. If refugia do exist, they could be located on private lands, as well as federal lands. If located on private lands, refugia may not receive the same level of protection as on federal lands. Therefore, it is concluded that if refugia exists within the sub-watersheds they could be at risk of degradation.

Sixth Field Effect:

(All Sixth Fields): MAINTAIN. Any refugia within the watershed that do exist would be protected within the Riparian Reserves. Based on the Project Design Features (PDFs) from the EA, it is expected that any refugia will be maintained.

Fifth Field Effect:

(All Fifth Fields): MAINTAIN. Based on anticipated site specific levels of effects analyzed above, it is expected that refugia would be maintained at the fifth-field scale.

Riparian Reserves

Environmental Baseline:

(All Sixth Fields): NOT PROPERLY FUNCTIONING. Riparian Reserves within this watershed have been impacted by agricultural use on private lands which has removed streamside vegetation, and by fire suppression, road building, and past timber harvest practices on public lands.

Sixth Field Effect:

(Big Butte N. Fork, Little Butte-Lick): MAINTAIN. Riparian Reserves will be protected under all proposed actions. No silviculture or fuels treatments will occur within the Riparian Reserves.
(Big Butte Lower, Big Butte Middle, McNeil Ck.): MAINTAIN It is expected that there may be short term, localized impacts to Riparian Reserve vegetation as a result of the proposed fuels treatments in Box Creek, Crowfoot Creek, and Poverty Flat ACEC . The thinning treatments will decrease stand densities and reduce the potential for catastrophic fire to enter the Riparian Reserves. Low-intensity underburns may be allowed to enter Riparian Reserves on intermittent streams where the riparian vegetation consists of fire-adapted species. The effects of the proposed actions are expected to result in long term benefits by restoring the historical fire regime within Riparian Reserves where the vegetation consists of fire-adapted species. Although the actions will move the indicator in a positive direction, they are not expected to change the indicator from “not properly functioning” to “at risk”, therefore the current condition will be maintained.

Fifth Field Effect:

(All Fifth Fields): MAINTAIN. The proposed actions would not be expected to impact the

riparian network at the fifth field scale.

Disturbance History

Environmental Baseline:

(Big Butte Lower, McNeil Ck., Little Butte-Lick): NOT PROPERLY FUNCTIONING. The five major disturbances that have occurred within the project area are absence of wildfire, timber harvest, road construction, surface water diversions, and the conversion of lands for agricultural use.

(Big Butte Middle, Big Butte N. Fork): AT RISK. The disturbance trend within this watershed includes the absence of wildfire, a shift from early seral species such as Ponderosa pine to mid to late seral species such as Douglas fir, increased stand densities, reduced interior habitat for species associated with late successional forest, timber harvesting, and road construction.

Sixth Field Effect:

(Big Butte Lower, Big Butte Middle, McNeil Ck.): MAINTAIN. Most of the timber harvest prescriptions are for density management, thinning, or select cut, which would leave canopy closures of Only 30 acres would be regeneration harvested. This would reduce the current canopy closure in that unit to 10 - 40%. In addition, approximately 3.04 miles of roads would be decommissioned, reducing road densities within the project area by 2.5 miles. Approximately 4280 acres of fuels treatments are also proposed. These actions could result in low level, short term increases in local disturbance levels. This would be expected to persist for approximately 10 years as residual vegetation increases in size and the canopy closure reaches pre-treatment levels. In the long term, the reduction of roads from the proposed road decommissioning and the proposed fuels treatments will restore previous disturbance impacts.

(Big Butte N. Fork, Little Butte-Lick): MAINTAIN. Only a small portion of the proposed projects are within these watersheds. The actions are not expected to result in a measureable increase in local disturbance levels.

Fifth Field Effect:

(All Fifth Fields): MAINTAIN. Through natural recovery of managed forest stands, fuel treatments, and road decommissioning and improvement, it is expected that the proposed actions would not contribute to disturbance levels at the fifth field scale.

Road Density and Location

Environmental Baseline:

(Big Butte Lower, Big Butte Middle, McNeil Ck., Big Butte N. Fork): NOT PROPERLY FUNCTIONING. Road densities are high in these sub-watersheds, averaging 4.5 miles/square mile.

(Little Butte-Lick): AT RISK. Although road densities are not as high in this sub-watershed as the rest of the project area (2.7 mi/sq. mi.), several roads are located adjacent to stream channels.

Sixth Field Effect:

(All Sixth Fields): MAINTAIN. Approximately 3.04 miles of roads will be decommissioned as part of the proposed projects. Road decommissioning could cause short term (<1 year), localized increases in sediment. However, reducing the road density within the watershed would move the

indicator in a positive direction.

Fifth Field Effect:

(Big Butte Creek): MAINTAIN. Approximately .51 miles of new permanent roads will be constructed, 3.04 miles of roads will be decommissioned, and approximately 37.14 miles of roads will be improved or renovated as part of the proposed projects. Road construction and decommissioning could cause short term (<1 year), localized increases in sediment. Although reducing the road density within the watershed would move the indicator in a positive direction, it is not expected to be enough to change from "not properly functioning" to "at risk" or from "at risk" to "properly functioning".

(Little Butte Creek): MAINTAIN. No new road construction or decommissioning is planned to occur within this watershed.

Floodplain Connectivity

Environmental Baseline:

(Little Butte-Lick): PROPERLY FUNCTIONING. ODFW aquatic inventories indicate that although portions of the streams surveyed had minor downcutting, generally floodplain connectivity was good within the reaches surveyed (ODFW, 1997).

(Big Butte Lower, Big Butte Middle, McNeil Ck., Big Butte N. Fork): AT RISK. Road building, agricultural practices, and residential development has led to stream confinement that has disconnected streams from the floodplains, reduced or eliminated side channels, and reduced flood refugia.

Sixth Field Effect:

(All Sixth Fields): MAINTAIN. No proposed action is expected to impact the floodplain connectivity. The current condition is expected to be maintained at the local level.

Fifth Field Effect:

(All Fifth Fields): MAINTAIN. No long-term effects are expected to occur that would measurably change current conditions at the fifth field.

ACS OBJECTIVE 2 - *Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.*

Summary

The project would maintain the current Riparian Reserve network. By establishing this Riparian Reserve network, floodplains that are currently inundated at regular intervals are expected to remain laterally connected through regular inundation. Areas that are not currently laterally connected and not within the project area will likely remain laterally disconnected in the short-term and possibly in the long-term. However, this is dependent upon private actions within the watersheds.

No actions are proposed that would physically or chemically obstruct routes to areas within or

outside the watershed that are critical for fulfilling life history requirements of aquatic and riparian-dependent species. No indicator is expected to be degraded in the fifth field watershed over the long term. No short or long-term effects are expected to occur that would measurably change current conditions at the fifth field. Therefore, it is concluded this project is consistent with ACS Objective 2.

Relevant Indicators from NMFS Matrix Used to Assist in the Consistency Determination

Off-channel Habitat	*Temperature*
Refugia	*Physical barriers*
Increase in drainage network	*Riparian Reserves*
Floodplain connectivity	

Discussion of Indicators

Off-channel Habitat See ACS Objective 1.

Refugia See ACS Objective 1.

Increase in Drainage Network

Environmental Baseline:

(Little Butte-Lick): AT RISK. High road densities alter the drainage network by increasing the amount of runoff that is intercepted through roadside ditches.

(Big Butte Lower, Big Butte Middle, McNeil Ck., Big Butte N. Fork): NOT PROPERLY FUNCTIONING. Water diversions, roads, soil compaction, and inadequate culverts have led to an alteration of the drainage network within the watershed Increased harvesting activities have led to a greater number of roads, more compacted soils, and less vegetation in the uplands to protect soil during storm events. This alteration in the drainage network has contributed to a general increase in sediment reaching the streams, which can result in a loss of spawning habitat.

Sixth Field Effect:

(Big Butte Lower, Big Butte Middle, McNeil Ck.): MAINTAIN. Approximately .51 miles of new permanent roads would be constructed under the proposed projects. However, this will be offset by decommissioning 3.04 miles of existing permanent roads which will result in a localized decrease in road related impacts and restore flows to the natural stream channels. Although these actions would not be considered of a magnitude that would measurably change baseline conditions at the sixth field scale, they are beneficial and would thus move the indicator in a positive direction.

(Big Butte N. Fork, Little Butte-Lick): MAINTAIN. No new permanent road construction or road decommissioning would occur within these sub-watersheds.

Fifth Field Effect:

(Big Butte Creek): MAINTAIN. Decommissioning existing permanent roads in the watershed will result in a localized decrease in road related impacts and restore flows to the natural stream channels. Although these actions would not be considered of a magnitude that would measurably

change baseline conditions at the fifth field, they are beneficial and would thus move the indicator in a positive direction.
(Little Butte Creek): MAINTAIN. No new permanent road construction or road decommissioning would occur within this watershed.

Floodplain connectivity See ACS Objective 1.

Temperature
Environmental Baseline:
(Big Butte Lower, Big Butte Middle, McNeil Ck.): NOT PROPERLY FUNCTIONING. Some streams within these sub-watersheds are currently listed under 303(d) of the Clean Water Act as water quality limited for exceeding summer water temperature standards.
(Big Butte N. Fork, Little Butte-Lick): AT RISK. Information on these streams is limited, however, based upon professional judgement it is determined that they would be at risk due to irrigation withdrawals which reduce stream flows.

Sixth Field Effect:
(All Sixth Fields): MAINTAIN. The proposed action would not alter any streamside vegetation that would be expected to influence stream temperature. Riparian thinning treatments would not remove any large trees that provide stream shade. Thinning would help the remaining stands reach a late-seral condition in a shorter time period by reducing competition for light, nutrients, and moisture.
Fifth Field Effect:
(All Fifth Fields): MAINTAIN. The current thermal regime in the watershed is not expected to be measurably influenced by the project. Over the long term, as more early to mid-successional streamside vegetation from the Riparian Reserves develops late-successional characteristics, the current thermal regime may improve to a more historic, cooler regime.

Physical Barriers
Environmental Baseline:
(All Sixth Fields): NOT PROPERLY FUNCTIONING. Numerous instream water diversion structures and impassable culverts exist throughout the watershed.
(All Sixth Fields): MAINTAIN. No new permanent roads would be built that would cross streams. No dams or water impoundments would be constructed.
Fifth Field Effect:
(All Fifth Fields): MAINTAIN. No dams or water impoundments would be constructed.

Riparian Reserves: See ACS Objective 1.

ACS OBJECTIVE 3 - *Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*

Summary

The physical integrity of the aquatic system would be maintained by establishing a 170' (nonfish-bearing streams) to 340' wide (fish-bearing streams) Riparian Reserve boundary. It is expected that small amounts of sediment could be generated from road, fuels treatment, and harvest related activities. This could cause localized, short-term increases to turbidity and fine sediment levels in streams adjacent to or downstream from the ground disturbing activity (within approximately 200'). Implementation of Best Management Practices (Medford ROD and RMP, pp. 162-170) and Project Design Features will minimize these increases. The anticipated increases would not be expected to affect any downstream beneficial uses or designated critical habitat of listed fish species. Additionally, road improvement, maintenance, and decommissioning should result in a long-term reduction in the risk of road generated sediment reaching local stream channels. Based on design features, the project should maintain elements outlined in ACS Objective 3. No NMFS indicator is degraded in the fifth field watershed in the long term. Therefore, this project is consistent with ACS Objective 3.

Relevant Indicators from NMFS Matrix Used to Assist in the Consistency Determination

Off-channel Habitat	*Width-Depth Ratio*
Substrate	*Streambank condition*
Large woody debris	*Floodplain connectivity*
Pool frequency	*Sediment/turbidity*
Pool quality	*Refugia*

Discussion of Indicators

Off-channel Habitat See ACS Objective 1

Substrate

Environmental Baseline:

(Big Butte Lower, Big Butte Middle): PROPERLY FUNCTIONING. ODFW aquatic inventory surveys indicate that substrate within these watersheds is properly functioning. Average percent of fines were found to be below 20%, while gravels, cobbles, and boulders generally had a high occurrence percentage.

(McNeil Ck., Little Butte-Lick, Big Butte N. Fork): NOT PROPERLY FUNCTIONING. Average percent fines on the streams surveyed by ODFW exceeded 20%. Gravel percents within the watershed were found to be generally low.

Sixth Field Effect:

(Big Butte Lower, Big Butte Middle, McNeil Ck.): MAINTAIN. It is expected that small amounts of sediment may be generated from road related activities, fuels treatments, and harvest related activities (hauling/increased truck traffic). This could cause localized, short term increases to baseline fine sediment levels in streams adjacent to or downstream from (within approximately 200 feet) the activity. Implementation of Best Management Practices and Project Design Features will minimize these impacts. The anticipated increases would not be expected to affect any downstream beneficial uses or negatively impact listed fish species. Although road

decommissioning activities may create short term, localized increases in sediment levels within the project area, the long term benefits of reducing the road density and thus sediment levels provide long term decreases in road related sediment runoff. It is expected that decreases in this type of sediment source would improve substrate within these areas.
(Big Butte N. Fork, Little Butte-Lick): MAINTAIN. No actions are expected to occur that would measurably impact substrate.

Fifth Field Effect:
(All Fifth Fields): MAINTAIN. It is anticipated that site level sediment inputs could occur. However, this is expected to be undetectable at the watershed scale. Additionally, road improvements and decommissioning are designed to reduce the risk of sediment inputs in the future. However, this is not expected to be of a level that would measurably improve the current conditions at the watershed scale.

Large Woody Debris (LWD)

Environmental Baseline:
(All Sixth Fields): NOT PROPERLY FUNCTIONING. ODFW aquatic inventories within the watershed found less than 25 key pieces of large wood per mile.

Sixth Field Effect:
(All Sixth Fields): MAINTAIN. No road building or harvesting would occur within the Riparian Reserves. Fuels treatments/thinning would be expected to accelerate the development of a late-successional forest capable of delivering large wood to the aquatic ecosystem, and would not reduce the current amount of wood available for recruitment into the stream.

Fifth Field Effect:
(All Fifth Fields): MAINTAIN. Fuels treatments would be expected to accelerate the development of a late-successional forest capable of delivering large wood to the aquatic ecosystem. Although these actions would move the indicator in a positive direction, the benefits would occur only at the site specific level and would not change the indicator from one category to another.

Pool Frequency

Environmental Baseline:
(Big Butte Lower, Big Butte Middle, Little Butte-Lick, Big Butte N. Fork): NOT PROPERLY FUNCTIONING. NMFS Matrix criteria establishes desirable pool frequency to be >30% of the stream channel area. No streams surveyed within these sub-watersheds reach the desired pool frequency levels.
(McNeil Ck.): AT RISK. ODFW surveys on McNeil Creek found there was 48.7% pool habitat. Although this number is within the desired range, professional judgement would indicate that this stream is still considered to be at risk.

Sixth Field Effect:
(All Sixth Fields): MAINTAIN. The proposed projects are not expected to affect pool forming processes within the watershed.

Fifth Field Effect:
(All Fifth Fields): MAINTAIN. The proposed actions would not affect pool frequency at the

fifth field scale.

Pool Quality

Environmental Baseline:

(Big Butte Lower, McNeil Ck., Big Butte N. Fork, Little Butte-Lick): NOT PROPERLY FUNCTIONING. ODFW aquatic habitat inventory data indicates pools quality is impaired by lack of wood and high percentages of fines.

(Big Butte Middle): AT RISK. Streams that have been surveyed by ODFW have indicated a lack of wood within pool habitat.

Sixth Field Effect:

(All Sixth Fields): MAINTAIN. The proposed projects are not expected to change the current pool quality within the watershed.

Fifth Field Effect:

(All Fifth Fields): MAINTAIN. No short or long term effects are expected to occur that would change the current pool quality at the fifth field scale.

Width/Depth Ratio

Environmental Baseline:

(Big Butte Lower, Little Butte-Lick): PROPERLY FUNCTIONING. ODFW aquatic habitat inventory data indicates that the average width/depth ratio on streams surveyed within the watershed is within the normal range for these stream types.

(Big Butte Middle, McNeil Ck., Big Butte N. Fork): NOT PROPERLY FUNCTIONING. ODFW data indicates that the average width/depth ratio on streams surveyed within these sub-watersheds are outside the expected range.

Sixth Field Effect:

(All Sixth Fields): MAINTAIN. No proposed actions are expected to occur that would measurably change the width/depth ratio of streams within the watershed.

Fifth Field Effect:

(All Fifth Fields): MAINTAIN. No short or long term effects are expected to occur that would change the current width/depth ratio of streams at the fifth field scale.

Streambank Condition

Environmental Baseline:

(McNeil Ck., Little Butte-Lick): PROPERLY FUNCTIONING. ODFW aquatic habitat inventory data indicates that in general streambanks are stabilized.

(Big Butte Lower, Big Butte N. Fork): AT RISK. ODFW aquatic habitat inventory data indicates that in general streambanks have less than adequate cover.

(Big Butte Middle): NOT PROPERLY FUNCTIONING. ODFW aquatic habitat inventory data indicates that in general streambanks do not have adequate cover.

Sixth Field Effect:

(All Sixth Fields): MAINTAIN. Streambank condition can be altered by direct disturbance of the streambank, removal of vegetation, an increase in peak flow, or an increase in debris torrent frequency. No timber harvest or road building would occur within the riparian reserves. Although low-intensity underburns in the intermittent stream channels may temporarily reduce annual forb and grass vegetative cover, the fires would not be expected to be of a magnitude that would affect those species which provide long-term bank stability.

Fifth Field Effect:

(All Fifth Fields): MAINTAIN. No long term effects are expected to occur that would measurably change the current streambank condition at the fifth field scale.

Floodplain Connectivity See ACS Objective 1.

Sediment/Turbidity

Environmental Baseline:

(Big Butte N. Fork, McNeil Ck., Little Butte-Lick): NOT PROPERLY FUNCTIONING. Little Butte Creek is currently listed under 303(d) of the Clean Water Act as water quality limited for exceeding sediment and turbidity standards. Information on other streams within the Little Butte watershed is unavailable. The Big Butte Creek Watershed Analysis identified sedimentation as an instream factor limiting fish production. Macroinvertebrate studies indicated that streams were generally healthy with high numbers and species present which indicate good water quality. However, macroinvertebrates which are sensitive to sedimentation are lower in numbers, indicating that high levels of sediment are present.

(Big Butte Middle, Big Butte Lower): PROPERLY FUNCTIONING. Percentages of fines (sand/silt/organics) within these streams were found to be low by both ODFW and BLM habitat surveys.

Sixth Field Effect:

(All Sixth Fields): MAINTAIN. It is expected that small amounts of sediment could be generated from road related activities, fuels treatments, and harvest related activities (hauling/increased truck traffic). This could cause short term, localized increases to turbidity levels in streams adjacent to or downstream from (within approximately 200') the activity. Implementation of Best Management Practices and Project Design Features will minimize these impacts. The anticipated increases would not be expected to affect any downstream beneficial uses or negatively impact listed fish species. Road decommissioning projects should result in a long-term reduction in the risk of road generated sediment reaching stream channels. However, this is not expected to be of a magnitude that would substantially change current conditions at the sixth field. No long-term effects are expected to occur from other proposed projects (timber sales) that would measurably change the current sediment regime or turbidity levels in the long term.

Fifth Field Effect:

(All Fifth Fields): MAINTAIN. No long term effects are expected to occur that would measurably change the current condition at the fifth field scale.

Refugia See ACS Objective 1.

ACS OBJECTIVE 4 - *Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*

Summary

It is expected that small amounts of sediment may be generated from road, fuels treatment, and

harvest related activities. This could cause localized, short-term increases to turbidity and fine sediment levels in streams adjacent to or downstream from the activity (within approximately 200'). Implementation of Best Management Practices and Project Design Features will minimize these increases. The anticipated increases would not be expected to affect any downstream beneficial uses or to negatively impact listed fish species. Road improvement, maintenance, and decommissioning should result in a long-term reduction in the risk of road-generated sediment reaching stream channels. Additionally, the proposed fuels treatments should serve to restore the cycling of forest nutrients to more closely resemble historical levels that occurred before fire suppression.

Any activity involving gas or diesel powered machinery within the Riparian Reserves has a potential to result in a hazardous materials spill. The greatest risk of chemical contamination that would result from the proposed action would be some type of fuel spill related to logging operations and refueling of equipment. The project design features stipulate that "all hazardous materials and petroleum products would be stored outside of the Riparian Reserves, in durable containers and located so that any accidental spill would be contained and not drain into the stream system" (EA, page 24, par. D-19.). The contractor would be required to have a Spill Prevention, Control and Countermeasure Plan (SPCC) to contain and clean-up the spill. If a hazardous materials spill did occur, this Plan would assure that the mechanisms are in place to respond quickly to the incident and minimize the likelihood of contamination of a waterway. It is expected that contamination of a stream system with hazardous materials is highly unlikely to occur and should not affect any waters within the project area.

Based on design features, the project should maintain elements outlined in ACS Objective 4. No NMFS indicator is degraded in the fifth field watershed in the long term. Therefore, this project is consistent with this ACS objective 4.

Relevant Indicators from NMFS Matrix Used to Assist in the Consistency Determination

Temperature *Chemical Contaminants/Nutrients*
Sediment/Turbidity

Discussion of Indicators

Temperature See ACS Objective 2.

Sediment/Turbidity See ACS Objective 3.

Chemical Contaminants/Nutrients
Environmental Baseline:
(Big Butte Middle, Big Butte Lower, Big Butte N. Fork, McNeil Ck.): AT RISK. No stream within the watershed has been identified as being water quality limited for chemicals and/or bacteria. Little information is available for these sub-watersheds. However, because of the influence of private agricultural practices which allow runoff from fields to enter the streams, it can be concluded that this watershed is at risk.
(Little Butte-Lick): NOT PROPERLY FUNCTIONING. The Little Butte Creek Watershed

Analysis identified Little Butte Creek, from the mouth to the North/South Fork confluence as being water quality limited due to the state bacteria standard being exceeded (Little Butte Creek WA, pg 99).

Sixth Field Effect:

(All Sixth Fields): MAINTAIN. The greatest risk of chemical contamination that would result from the proposed action would be a fuel spill related to logging operations and refueling of equipment. The project design features stipulate that all hazardous materials (particularly petroleum products) would be stored in durable containers and located so that any accidental spill would be contained and not drain into any riparian areas (EA, pg. 24, par. D-19.) The contractor would be required to have a hazardous materials action plan to contain and clean up any spill. It is expected that contamination of a stream channel with hazardous materials is highly unlikely to occur and should not affect any waters within the project area. In addition, the proposed fuels treatments would serve to restore the cycling of forest nutrients to more closely resemble historical levels that occurred before fire suppression.

Fifth Field Effect:

(All Fifth Fields): MAINTAIN. No long term effects are expected to occur that would measurably change the current condition at the fifth field scale.

ACS OBJECTIVE 5 -*Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*

Summary

It is expected that small amounts of sediment may be generated from road, fuels treatment, and harvest related activities. This could cause localized, short-term increases to turbidity and fine sediment levels in streams adjacent to or downstream from the activity (within approximately 200'). Implementation of Best Management Practices and Project Design Features will minimize these increases. Due to the distance of the timber harvest units from designated critical habitat of listed fish species, and by restricting harvest to areas outside of Riparian Reserves, the effects to listed fish species and critical habitat are expected to be negligible. The anticipated sediment increases would not be expected to affect any downstream beneficial uses or to negatively impact listed fish species or their critical habitat.

Based on design features, the project should maintain elements outlined in ACS Objective 5. No NMFS indicator is degraded in the fifth field watershed in the long term. Therefore, this project is consistent with ACS Objective 5.

Relevant Indicators from NMFS Matrix Used to Assist in the Consistency Determination

Sediment/turbidity	*Road density & location*
Substrate	*Increase in drainage network*
Change in peak/base flow	

Discussion of Indicators

Sediment/turbidity See ACS Objective 3.

Substrate See ACS Objective 3.

Change in Peak/Base Flows

Environmental Baseline:

(All Sixth Fields): AT RISK. Human related activities that have altered the peak and base flows within the watershed include the removal of vegetation from timber harvest and wildfire, road building, water diversions, and soil compaction (Little Butte WA, pg 87).

Sixth Field Effect:

(All Sixth Fields): MAINTAIN. Peak, summer, and annual flows are expected to remain within the natural range of variability. Changes in infiltration, antecedent moisture conditions, interception, and evapotranspiration losses due to timber harvesting and fuels treatments are not expected to substantially alter the flow regime. A residual canopy closure of approximately 40% will be maintained in the majority of the harvest units. Reduction of stand densities to this level is expected to lower the risk of a high-intensity stand replacement fire while also accelerating the growth potential of the remaining trees. In addition, because the units are located on low gradient slopes it is not expected that there will be any impacts on peak flows due to increased runoff from these units. These factors combined with the other Project Design Features, including ripping all skid roads in tractor units to a depth of 18", restricting tractor yarding to slopes <35%, waterbarring all skid roads, restricting tractor yarding when soil moisture exceeds 25%, and no harvesting within Riparian Reserves, should adequately address the issues of soil compaction and peak flows in these timber sale units. The proposed action also includes road decommissioning. Decreases in the road network are expected to reduce the risk of road-related flow increases.

Fifth Field Effect:

(All Fifth Fields): MAINTAIN. A review of the harvest acres in the Lower Big Butte project area shows that out of 400 proposed tractor logged acres in the Big Butte Creek 5th field watershed (43,817 acres total), it is estimated that only 10 - 12% (40-50 acres) would actually be compacted by tractor logging because the equipment will remain on pre-existing designated skid trails. This equates to only 1/10th of 1 percent of the entire 5th field watershed. No long term effects are expected to occur that would measurably change the current flow regime at the fifth field scale. Additionally, road decommissioning should result in a long-term reduction in the risk of roads influencing the flow regime.

Road density & location See ACS Objective 1.

Increase in drainage network See ACS Objective 2.

ACS OBJECTIVE 6 - *Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*

Peak, summer, and annual flows are influenced primarily by precipitation intensity, catchment size, soil characteristics, vegetative cover, road densities, and topographic features. Human related activities that have altered the peak and base flows within the watershed include the removal of vegetation from timber harvest and wildfire, road building, water diversions, and soil

compaction. Changes in infiltration, antecedent moisture conditions, interception, and evapotranspiration losses due to timber harvesting and fuels treatments are not expected to substantially alter the flow regime.
Based on design features, the project should maintain elements outlined in ACS Objective 6. In addition, the proposed fuels treatments should serve to restore the cycling of forest nutrients and wood routing to more closely resemble historical levels that occurred before fire suppression. No NMFS indicator is degraded in the fifth field watershed in the long term. Therefore, this project is consistent with ACS Objective 6.

Relevant Indicators from NMFS Matrix Used to Assist in the Consistency Determination

Change in peak/base flow *Increase in drainage network*

Discussion of Indicators

Change in peak/base flow See ACS Objective 5.

Increase in drainage network See ACS Objective 2.

ACS OBJECTIVE 7 - *Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.*

Summary
The proposed action would maintain the current Riparian Reserve network on federally administered lands over an indefinite time period. By establishing this Riparian Reserve network the timing, magnitude, variability and duration of floodplain inundation is expected to be maintained in the short-term and restored through recovery over the long-term. Areas that are not currently connected with the floodplain would likely remain disconnected in the short-term and possibly in the long-term. However, this is highly dependent upon private actions within the watershed. No change in the current flow regime is anticipated. No road construction or timber harvest would occur within the Riparian Reserves.

Based on design features, the proposed project should maintain and begin to restore the elements outlined in ACS Objective 7. Therefore it is concluded the proposed project is consistent with ACS Objective 7.

Relevant Indicators from NMFS Matrix Used to Assist in the Consistency Determination

Increase in drainage network *Floodplain connectivity*
Change in peak/base flow

Discussion of Indicators

Increase in drainage network See ACS Objective 2.

Change in peak/base flow See ACS Objective 5.

Floodplain connectivity See ACS Objective 1.

ACS OBJECTIVE 8 - *Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.*

Summary

The proposed action would maintain the current Riparian Reserve network on federally administered lands over an indefinite time period. The proposed action would not alter any streamside vegetation that would be expected to influence stream temperature. Therefore, the proposed harvest prescription is not expected to measurably change the current thermal regime at the site or in the watershed over the short-term. Over the long-term, as more early to mid-successional stands develop into a late-successional condition, the current thermal regime may begin to approximate a historic, cooler thermal regime. However, this is also dependent upon private activities within the watershed. By establishing the Riparian Reserve network, adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, channel migration, and coarse woody debris recruitment is expected to be maintained on federal lands in the short-term and restored through recovery over the long-term.

Based on design features, the proposed project should maintain and begin to restore the elements outlined in ACS Objective 7. Therefore it is concluded the proposed project is consistent with ACS Objective 7.

Relevant Indicators from NMFS Matrix Used to Assist in the Consistency Determination

Large woody debris	*Riparian Reserves*
Road density & location	*Disturbance history*

Discussion of Indicators

Large Woody Debris See ACS Objective 3.

Road Density and Location See ACS Objective 1.

Riparian Reserves See ACS Objective 1.

Disturbance History See ACS Objective 1.

ACS OBJECTIVE 9 - *Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.*

Summary
The proposed action would maintain the current Riparian Reserve network over an indefinite time period. By establishing this Riparian Reserve network, habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species is expected to be maintained in the short-term and restored over the long-term. The riparian thinning treatments will reduce the risks of a stand-replacing fire from occurring, and will also allow the vegetation to reach a late-seral condition in a shorter time period by reducing competition for light, nutrients, and moisture. No long-term negative impacts are expected to occur as a result of the proposed projects. Therefore, it is concluded the proposed projects should maintain and begin to restore habitat elements of ACS Objective 9.

Relevant Indicators from NMFS Matrix Used to Assist in the Consistency Determination

Off-channel Habitat	*Physical barriers*
Substrate	*Refugia*
Large woody debris	*Floodplain connectivity*
Riparian Reserves	*Pool quality*
Sediment/turbidity	*Width/depth ratio*
Temperature	*Chemical concentration/nutrients*

Please refer to discussions in appropriate ACS Objectives 1-8.

Conclusion

Based on the above review, I find the proposed project is consistent with Watershed Analysis recommendations and findings, applicable Northwest Forest Plan Standards and Guidelines, NEPA Documentation, and applicable aspects of NMFS' March 18, 1997 Biological Opinion. In addition, I find the proposed project does not hinder or prevent attainment of Aquatic Conservation Strategy objectives at the 5th field watershed scale over the long-term.

Lance Nimmo _____
Area Manager, Butte Falls Resource Area

I. Dichotomous Key for Making ESA Determination of Effects

Project Name: Lower Big Butte Landscape Projects
Resource Area: Butte Falls Resource Area
Project Status: Future

1. Are there any proposed/listed anadromous salmonids and/or proposed/designated critical habitat in the watershed or downstream from the watershed?

   NO.....No effect
   YES.....May Affect, **Go to 2**

2. Will the proposed action have any effect whatsoever[1] on the species and/or critical habitat?

   NO.....No effect
   YES.....**Go to 3**

3. Does the proposed action(s) have the potential to hinder attainment of relevant properly functioning indicators (from section G)?[2]

   NO.....**Go to 4**
   YES.....Likely to adversely affect

4. Does the proposed action(s) have the potential to result in "take"[3] of proposed/listed anadromous salmonids or destruction/adverse modification of proposed/designated critical habitat?

   A. There is a negligible (extremely low) probability of take of proposed/listed anadromous salmonids or destruction/adverse modification of critical habitat. .....Not likely to adversely affect.

   B. There is more than a negligible probability of take of proposed/listed anadromous salmonids or destruction/adverse modification of critical habitat .....Likely to adversely affect[4]

[1] "Any effect whatsoever" includes small effects, effects that are unlikely to occur, and beneficial effects. I.e., a "no effect" Determination is only appropriate if the proposed action will literally have no effect whatsoever on the species and/or critical habitat, not a small effect, an effect that is unlikely to occur, or a beneficial effect.

[2] We acknowledge there may be site level degrades associated with the project, but there is a negligible potential that the project will hinder attainment of relevant properly functioning indicators.

[3] "Take" - The ESA (Section 3) defines take as "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct". The USFWS further defines "harm" as "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering", and "harass" as "actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering".

[4] Document of expected adverse effect follows this key.

Biologist: Jayne LeFors **Date:** 6/13/01

CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF PROPOSED ACTION(S) ON RELEVANT INDICATORS

Project Name: Lower Big Butte Landscape Project
Physiographic Province: Cascades West
4th Field HUC: Upper Rogue
5th Field HUC: Big Butte Creek
6th Field HUC: McNeil Creek
Project Scale
Date: 6/13/01
Preparer: Jayne LeFors
Resource Area, Medford BLM: Butte Falls

	PATHWAY INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)[2]			
		Properly Functioning[1]	At Risk[1]	*Not* Properly Functioning[1]	Restore[2]	Maintain[2]	Degrade[2]	Consistent with ACS?
Water Quality	Temperature			PJ		X		Y
	Sediment			ODFW		X		Y
	Chem. Contam./ Nutrient Load		PJ			X		Y
Habitat Elements	Physical Barriers			PJ		X		Y
	Substrate			ODFW		X		Y
	Large Woody Debris			ODFW		X		Y
	Pool Frequency		ODFW			X		Y
	Pool Quality			ODFW		X		Y
	Off-Channel Habitat		no data			X		Y
	Refugia		no data			X		Y
Flow/Hydrol. Chan. Cond. & Dyna.	Width/Depth Ratio			ODFW		X		Y
	Streambank Condition	ODFW				X		Y
	Floodplain Connectivity		PJ			X		Y
	Peak/Base Flows		PJ			X		Y
	Drainage Network Increase			WA		X		Y
	Road Density and Location			WA		X		Y
	Disturbance History			WA		X		Y
Watershed Condition	Riparian Reserve			BLM		X		Y

DEQ=Oregon Dept. of Environmental Quality; WA= Watershed Analysis; ODFW=Oregon Dept. of Fish & Wildlife Aquatic Habitat Inventories, 1997; BLM=BLM Stream/Riparian Surveys; PJ=Professional Judgement

1 These 3 categories of function ("properly functioning," "at risk," "not properly functioning") are defined for each indicator in the "Matrix of Factors and Indicators" for each physiographic province as agreed to by the Level 1 Teams. 2 For the purposes of this checklist, "restore" means to change an "at risk" indicator to "properly functioning" or a "not properly functioning" indicator to "at risk" or "properly functioning." "Maintain" means that the function of an indicator does not change. "Degrade" means to change the function of an indicator for the worse.

CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF PROPOSED ACTION(S) ON RELEVANT INDICATORS

Project Name: Lower Big Butte Landscape Project
Physiographic Province: Cascades West
4th Field HUC: Upper Rogue
5th Field HUC: Big Butte Creek
6th Field HUC: Big Butte Middle
Project Scale
Date: 6/13/01
Preparer: Jayne LeFors
Resource Area, Medford BLM: Butte Falls

	PATHWAY INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)[2]			
		Properly Functioning[1]	At Risk[1]	*Not* Properly Functioning[1]	Restore[2]	Maintain[2]	Degrade[2]	Consistent with ACS?
Water Quality	Temperature			DEQ		X		Y
	Sediment	ODFW				X		Y
	Chem./ Nutrient		PJ			X		Y
Habitat Elements	Physical Barriers			ODFW/WA		X		Y
	Substrate	ODFW				X		Y
	Large Woody Debris			ODFW		X		Y
	Pool Frequency			ODFW		X		Y
	Pool Quality		ODFW			X		Y
	Off-Channel Habitat		ODFW/PJ			X		Y
	Refugia		ODFW/PJ			X		Y
Channel Condition & Dyna.	Width/Depth Ratio			ODFW		X		Y
	Streambank Condition			ODFW		X		Y
	Floodplain Connectivity		WA			X		Y
Flow/Hydrology	Peak/Base Flows		WA/PJ			X		Y
	Drainage Network Increase			WA		X		Y
	Road Density and Location			WA		X		Y
Watershed Condition	Disturbance History		WA			X		Y
	Riparian Reserve		BLM			X		Y

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of an indicator does not change. "Degrade" means to change the function of an indicator for the worse.

CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF PROPOSED ACTION(S) ON RELEVANT INDICATORS

Project Name: Lower Big Butte Landscape Project
Physiographic Province: Cascades West
4th Field HUC: Upper Rogue
5th Field HUC: Big Butte Creek
6th Field HUC: Big Butte Lower
Project Scale
Date: 6/13/01
Preparer: Jayne LeFors
Resource Area, Medford BLM: Butte Falls

	PATHWAY INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)[2]			
		Properly Functioning[1]	At Risk[1]	*Not* Properly Functioning[1]	Restore[2]	Maintain[2]	Degrade[2]	Consistent with ACS?
Water Quality	Temperature			DEQ		X		Y
	Sediment	ODFW/BLM				X		Y
	Chem. Contam./ Nutrient Load		PJ			X		Y
Habitat Elements	Physical Barriers			WA		X		Y
	Substrate	ODFW				X		Y
	Large Woody Debris			ODFW		X		Y
	Pool Frequency			ODFW		X		Y
	Pool Quality			ODFW		X		Y
	Off-Channel Habitat		ODFW			X		Y
	Refugia		No data			X		Y
Flow/Hydro/Chan Cond/Dyna	Width/Depth Ratio	ODFW				X		Y
	Streambank Condition		BLM/ODFW			X		Y
	Floodplain Connectivity		BLM/ODFW			X		Y
	Peak/Base Flows		PJ			X		Y
	Drainage Network Increase			WA		X		Y
	Road Density and Location			WA		X		Y
	Disturbance History			WA		X		Y
Watershed Condition	Riparian Reserve		BLM/WA			X		Y

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CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF PROPOSED ACTION(S) ON RELEVANT INDICATORS

Project Name: Lower Big Butte Landscape Project
Physiographic Province: Cascades West
4th Field HUC: Upper Rogue
5th Field HUC: Little Butte Creek
6th Field HUC: Little Butte/Lick Creek
Project Scale
Date: 6/13/01
Preparer: Jayne LeFors
Resource Area, Medford BLM: Butte Falls

	PATHWAY INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)[2]			
		Properly Functioning[1]	At Risk[1]	*Not* Properly Functioning[1]	Restore[2]	Maintain[2]	Degrade[2]	Consistent with ACS?
Water Quality	Temperature		DEQ			X		Y
	Sediment			DEQ/ODFW		X		Y
	Chem. Contam./ Nutrient Load			WA		X		Y
Habitat Elements	Physical Barriers			ODFW		X		Y
	Substrate			ODFW		X		Y
	Large Woody Debris			ODFW		X		Y
	Pool Frequency			ODFW		X		Y
	Pool Quality			ODFW		X		Y
	Off-Channel Habitat		ODFW			X		Y
	Refugia		ODFW			X		Y
Channel Cond. & Dyna.	Width/Depth Ratio	ODFW				X		Y
	Streambank Condition	ODFW				X		Y
	Floodplain Connectivity	ODFW				X		Y
Flow/Hydrology	Peak/Base Flows		WA			X		Y
	Drainage Network Increase		WA			X		Y
	Road Density and Location		WA			X		Y
Watershed Condition	Disturbance History			WA		X		Y
	Riparian Reserve			WA		X		Y

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of an indicator does not change. "Degrade" means to change the function of an indicator for the worse.

PATHWAY INDICATORS		ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)[2]			
		Properly Functioning[1]	At Risk[1]	*Not* Properly Functioning[1]	Restore[2]	Maintain[2]	Degrade[2]	Consistent with ACS?
Water Quality	Temperature			DEQ		X		Y
	Sediment			DEQ		X		Y
	Chem. Contam./ Nutrient Load			DEQ		X		Y
Habitat Elements	Physical Barriers			LB WA		X		Y
	Substrate		ODFW/WA			X		Y
	Large Woody Debris			ODFW/WA		X		Y
	Pool Frequency			ODFW		X		Y
	Pool Quality			ODFW		X		Y
	Off-Channel Habitat		WA			X		Y
	Refugia		WA			X		Y
	Width/Depth Ratio		ODFW			X		Y
Wshed Condition/Flow/Hydrol. Chan. Cond. & Dyna.	Streambank Condition		WA			X		Y
	Floodplain Connectivity		WA			X		Y
	Peak/Base Flows			WA		X		Y
	Drainage Network Increase			WA		X		Y
	Road Density and Location			WA		X		Y
	Disturbance History		WA			X		Y
	Riparian Reserve		WA/BLM			X		Y

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CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF PROPOSED ACTION(S) ON RELEVANT INDICATORS

Project Name: Lower Big Butte Landscape Project
Physiographic Province: Cascades West
4th Field HUC: Upper Rogue
5th Field HUC: Big Butte Creek
6th Field HUC: Big Butte Ck. N. Fork
Project Scale
Date: 6/13/01
Preparer: Jayne LeFors
Resource Area, Medford BLM: Butte Falls

	PATHWAY INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)[2]			
		Properly Functioning[1]	At Risk[1]	*Not* Properly Functioning[1]	Restore[2]	Maintain[2]	Degrade[2]	Consistent with ACS?
Water Quality	Temperature			DEQ		X		Y
	Sediment			ODFW		X		Y
	Chem. Contam./ Nutrient Load		PJ			X		Y
Habitat Elements	Physical Barriers			ODFW		X		Y
	Substrate			ODFW		X		Y
	Large Woody Debris			ODFW		X		Y
	Pool Frequency			ODFW		X		Y
	Pool Quality			ODFW		X		Y
	Off-Channel Habitat		ODFW			X		Y
	Refugia		PJ			X		Y
	Width/Depth Ratio			ODFW		X		Y
Watershed Condition/Flow/Hydrol. Cond. & Dyna.	Streambank Condition		ODFW			X		Y
	Floodplain Connectivity		PJ			X		Y
	Peak/Base Flows		PJ			X		Y
	Drainage Network Increase			PJ		X		Y
	Road Density and Location			WA		X		Y
	Disturbance History			WA/PJ		X		Y
	Riparian Reserve			BLM/ODFW		X		Y

DEQ=Oregon Dept. of Environmental Quality; WA= Watershed Analysis; ODFW=Oregon Dept. of Fish & Wildlife Aquatic Habitat Inventories, 1997; BLM=BLM Stream/Riparian Surveys

1 These 3 categories of function ("properly functioning," "at risk," "not properly functioning") are defined for each indicator in the "Matrix of Factors and Indicators" for each physiographic province as agreed to by the Level 1 Teams. 2 The effects of the action are based on which way the project is likely to move a relevant indicator. However, no changes in baseline conditions are expected. For the purposes of this checklist, "restore" means to change an "at risk" indicator to "properly functioning" or a "not properly functioning" indicator to "at risk" or "properly functioning." "Maintain" means that the function of an indicator does not change. "Degrade" means to change the function of an indicator for the worse.

Date: March 5, 2002

To: Files - Lower Big Butte Project

From: Shawn Simpson, Butte Falls Resource Area Hydrologist

Subject: LBB Hydrology Appendix

Hydrologic Recovery

The removal of vegetation reduces interception which allows more precipitation to reach the soil surface and infiltrate or become runoff. The increased runoff and available soil moisture can increase peak flows. Large openings due to vegetation removal within the transient snow zone (TSZ) can produce an increase in snowpack accumulation. This additional snowpack can quickly melt during a rain on snow (ROS) event and may result in extremely high streamflows. Once vegetation is removed, it is considered to be hydrologically immature until new vegetation obtains the same crown closure as the previous stand. Douglas-fir and white fir stands are generally considered to be 100 percent hydrologically recovered at 70 percent crown closure and Pine stands are fully recovered at about 40 percent. These canopy closure percentages reflect reference conditions when natural disturbances were more frequent. The range of natural variability includes canopy closure that would be greater and less that full hydrologic recovery.

The hydrologic recovery data was calculated by applying recovery factors to the vegetation information derived from the Western Oregon Digital Image Processing (WODIP) satellite imagery data. The satellite imagery data is only available in 10 percent increments, starting at 5 percent, so full recovery was taken at 75% rather than 70%. The satellite data does not have the capability of distinguishing between tree series so pine stands had to be treated the same as Douglas-fir. Therefore, the percent hydrologic recovery calculated is a conservative estimate. Areas classified as water, rock, and grassland/shrubland are considered fully recovered for this analysis. Uban/agricultural areas are 0 percent recovered.

Hydrologic Recovery	Percent of Area Hydrologically Recovered	
Analysis Area	All Lands	Transient Snow Zone
Lower Big Butte	71.0	79.0*(Ave from 3 WS)
McNeil Creek	65.8	81.4
Big Butte Creek, Middle	77.1	82.7
Clark Creek	73.1	73.4
Big Butte, Lower	69.9	NA

HYDROLOGIC
RECOVERY
Lower Big Butte -
Watershed Total

Veg. Class	% Crown Closure	Acres	Recovery Factor	Acres Recovered	% Recovered
Water	<5	1	1.00	1	
Urban/Agr.	<5	3165	0.00	0	
Rock	<5	528	1.00	528	
Nonforest	<5	13041	1.00	13041	
Hardwoods	35-44	2141	0.54	1156	
	75-84	23	1.00	23	
	85-94	146	1.00	146	
	>95	441	1.00	441	
Early Seral	<5	859	0.00	0	
Seedlings-Poles	<5	0	0.00	0	
	6-15	0	0.14	0	
	25-34	3148	0.40	1259	
	55-64	1054	0.80	843	
	65-74	2033	0.93	1891	
	75-84	1177	1.00	1177	
	85-94	2315	1.00	2315	
	>95	118	1.00	118	
Large Poles	< 5	129	0.00	0	
	6-15	3909	0.14	547	
	25-34	1403	0.40	561	
	35-44	100	0.54	54	
	45-54	321	0.67	215	
	55-64	3086	0.80	2469	
	75-84	859	1.00	859	
	85-94	795	1.00	795	
	>95	647	1.00	647	
Mature	55-64	140	0.80	112	
	65-74	269	0.93	250	
	75-84	748	1.00	748	
	85-94	361	1.00	361	
	>95	417	1.00	417	
Late-Successional	>85	444	1.00	444	
TOTALS		43818		31419	71.7

HYDROLOGIC
RECOVERY
Clark Creek Sixth
Field Watershed

Veg. Class	% Crown Closure	Acres	Recovery Factor	Acres Recovered	% Recovered
Water	<5	0	1.00	0	
Urban/Agr.	<5	90	0.00	0	
Rock	<5	113	1.00	113	
Nonforest	<5	1422	1.00	1422	
Hardwoods	35-44	256	0.54	138	
	75-84	17	1.00	17	
	85-94	58	1.00	58	
	>95	107	1.00	107	
Early Seral	<5	328	0.00	0	
Seedlings-Poles	<5	0	0.00	0	
	6-15	0	0.14	0	
	25-34	741	0.40	296	
	55-64	142	0.80	114	
	65-74	492	0.93	458	
	75-84	192	1.00	192	
	85-94	639	1.00	639	
	>95	43	1.00	43	
Large Poles	< 5	29	0.00	0	
	6-15	746	0.14	104	
	25-34	211	0.40	84	
	35-44	51	0.54	28	
	45-54	55	0.67	37	
	55-64	474	0.80	379	
	75-84	304	1.00	304	
	85-94	146	1.00	146	
	>95	157	1.00	157	
Mature	55-64	28	0.80	22	
	65-74	67	0.93	62	
	75-84	136	1.00	136	
	85-94	117	1.00	117	
	>95	118	1.00	118	
Late-Successional	>85	110	1.00	110	
TOTALS		7389		5402	73.1

HYDROLOGIC
RECOVERY
Clark Creek Sixth
Field Watershed-
Transient Snow Zone

Veg. Class	% Crown Closure	Acres	Recovery Factor	Acres Recovered	% Recovered
Water	<5	0	1.00	0	
Urban/Agr.	<5	1	0.00	0	
Rock	<5	81	1.00	81	
Nonforest	<5	626	1.00	626	
Hardwoods	35-44	81	0.54	44	
	75-84	6	1.00	6	
	85-94	30	1.00	30	
	>95	63	1.00	63	
Early Seral	<5	150	0.00	0	
Seedlings-Poles	<5	0	0.00	0	
	6-15	0	0.14	0	
	25-34	395	0.40	158	
	55-64	56	0.80	45	
	65-74	199	0.93	185	
	75-84	73	1.00	73	
	85-94	348	1.00	348	
	>95	13	1.00	13	
Large Poles	< 5	13	0.00	0	
	6-15	372	0.14	52	
	25-34	91	0.40	36	
	35-44	28	0.54	15	
	45-54	25	0.67	17	
	55-64	150	0.80	120	
	75-84	147	1.00	147	
	85-94	63	1.00	63	
	>95	76	1.00	76	
Mature	55-64	13	0.80	10	
	65-74	23	0.93	21	
	75-84	45	1.00	45	
	85-94	71	1.00	71	
	>95	60	1.00	60	
Late-Successional	>85	60	1.00	60	
TOTALS		3359		2466	73.4

HYDROLOGIC
RECOVERY
Big Butte Creek,
Middle - Sixth Field
Watershed

Veg. Class	% Crown Closure	Acres	Recovery Factor	Acres Recovered	% Recovered
Water	<5	0	1.00	0	
Urban/Agr.	<5	472	0.00	0	
Rock	<5	182	1.00	182	
Nonforest	<5	3376	1.00	3376	
Hardwoods	35-44	543	0.54	293	
	75-84	3	1.00	3	
	85-94	55	1.00	55	
	>95	187	1.00	187	
Early Seral	<5	164	0.00	0	
Seedlings-Poles	<5	0	0.00	0	
	6-15	0	0.14	0	
	25-34	926	0.40	370	
	55-64	249	0.80	199	
	65-74	606	0.93	564	
	75-84	465	1.00	465	
	85-94	825	1.00	825	
	>95	30	1.00	30	
Large Poles	< 5	49	0.00	0	
	6-15	953	0.14	133	
	25-34	323	0.40	129	
	35-44	35	0.54	19	
	45-54	109	0.67	73	
	55-64	947	0.80	758	
	75-84	247	1.00	247	
	85-94	263	1.00	263	
	>95	322	1.00	322	
Mature	55-64	72	0.80	58	
	65-74	120	0.93	112	
	75-84	297	1.00	297	
	85-94	183	1.00	183	
	>95	227	1.00	227	
Late-Successional	>85	265	1.00	265	
TOTALS		12495		9635	77.1

HYDROLOGIC
RECOVERY
Big Butte Creek,
Middle -Transient
Snow Zone

Veg. Class	% Crown Closure	Acres	Recovery Factor	Acres Recovered	% Recovered
Water	<5	0	1.00	0	
Urban/Agr.	<5	0	0.00	0	
Rock	<5	25	1.00	25	
Nonforest	<5	238	1.00	238	
Hardwoods	35-44	53	0.54	29	
	75-84	1	1.00	1	
	85-94	20	1.00	20	
	>95	45	1.00	45	
Early Seral	<5	46	0.00	0	
Seedlings-Poles	<5	0	0.00	0	
	6-15	0	0.14	0	
	25-34	196	0.40	78	
	55-64	36	0.80	29	
	65-74	142	0.93	132	
	75-84	79	1.00	79	
	85-94	314	1.00	314	
	>95	15	1.00	15	
Large Poles	< 5	1	0.00	0	
	6-15	176	0.14	25	
	25-34	40	0.40	16	
	35-44	10	0.54	5	
	45-54	28	0.67	19	
	55-64	116	0.80	93	
	75-84	113	1.00	113	
	85-94	90	1.00	90	
	>95	151	1.00	151	
Mature	55-64	13	0.80	10	
	65-74	24	0.93	22	
	75-84	47	1.00	47	
	85-94	146	1.00	146	
	>95	85	1.00	85	
Late-Successional	>85	192	1.00	192	
TOTALS		2442		2019	82.7

HYDROLOGIC
RECOVERY
McNeil Creek - Sixth
Field Watershed

Veg. Class	% Crown Closure	Acres	Recovery Factor	Acres Recovered	% Recovered
Water	<5	0	1.00	0	
Urban/Agr.	<5	2036	0.00	0	
Rock	<5	129	1.00	129	
Nonforest	<5	5117	1.00	5117	
Hardwoods	35-44	954	0.54	515	
	75-84	2	1.00	2	
	85-94	24	1.00	24	
	>95	116	1.00	116	
Early Seral	<5	304	0.00	0	
Seedlings-Poles	<5	0	0.00	0	
	6-15	0	0.14	0	
	25-34	1059	0.40	424	
	55-64	442	0.80	354	
	65-74	580	0.93	539	
	75-84	353	1.00	353	
	85-94	566	1.00	566	
	>95	28	1.00	28	
Large Poles	< 5	46	0.00	0	
	6-15	1567	0.14	219	
	25-34	580	0.40	232	
	35-44	12	0.54	6	
	45-54	116	0.67	78	
	55-64	1154	0.80	923	
	75-84	200	1.00	200	
	85-94	268	1.00	268	
	>95	142	1.00	142	
Mature	55-64	34	0.80	27	
	65-74	56	0.93	52	
	75-84	229	1.00	229	
	85-94	51	1.00	51	
	>95	55	1.00	55	
Late-Successional	>85	65	1.00	65	
TOTALS		16285		10715	65.8

HYDROLOGIC
RECOVERY
McNeil Creek -
Transient Snow Zone

Veg. Class	% Crown Closure	Acres	Recovery Factor	Acres Recovered	% Recovered
Water	<5	0	1.00	0	
Urban/Agr.	<5	0	0.00	0	
Rock	<5	0	1.00	0	
Nonforest	<5	48	1.00	48	
Hardwoods	35-44	16	0.54	9	
	75-84	0	1.00	0	
	85-94	5	1.00	5	
	>95	12	1.00	12	
Early Seral	<5	9	0.00	0	
Seedlings-Poles	<5	0	0.00	0	
	6-15	0	0.14	0	
	25-34	29	0.40	12	
	55-64	7	0.80	6	
	65-74	17	0.93	16	
	75-84	15	1.00	15	
	85-94	62	1.00	62	
	>95	2	1.00	2	
Large Poles	< 5	1	0.00	0	
	6-15	30	0.14	4	
	25-34	10	0.40	4	
	35-44	1	0.54	1	
	45-54	3	0.67	2	
	55-64	29	0.80	23	
	75-84	12	1.00	12	
	85-94	24	1.00	24	
	>95	23	1.00	23	
Mature	55-64	2	0.80	2	
	65-74	2	0.93	2	
	75-84	8	1.00	8	
	85-94	21	1.00	21	
	>95	6	1.00	6	
Late-Successional	>85	19	1.00	19	
TOTALS		413		336	81.4

Alt 2	Big Butte Middle	Big Butte Lower	McNeil Cr. LBB		Big Butte - 5th
Treatment					
DM	113.9	18.3	72.1	204.3	
DM-Slash buster	47.7	96.2	265.6	409.5	
DM-slash/pile/burn	0	0	0	0	
NGFMA Regen	32.3	0	31.9	64.2	
SGFMA Regen	108.8	0	30.6	139.4	
Select Cut	105.2	9.6	19.6	134.4	
Shelterwood	0	0	11.6	11.6	
Thin	263.6	0	135.6	399.2	
Underburn	78.4	174.2	134	386.6	
Understory Thin	472.3	646	119.2	1237.5	
Meadow Burn	347.2	45.5	16.3	409	
Slashbuster/burn	937	236.5	282.1	1455.6	
slash/handpile/burn	37.5	207.9	66.9	312.3	
Hardwood Conversion	0	0	48.6	48.6	
Total Acres treated	2543.9	1434.2	1234.1	5212.2	4750.9
Total WS Acres	12492	7644	16288	43814	157776
Total percent of WS	20.4	18.8	7.6	11.9	3.0
Logging System					
Cable	114.75	9.6	48.3	172.65	
Heli	140.8	0	185.7	326.5	
Tractor	368.25	14.5	138.3	521.05	
Slashbuster	984.7	332.7	547.7	1865.1	
Hand Treatment	900.3	1065.9	304.4	2270.6	
ATV	35.1	11.5	9.7	56.3	
Total Acres	2543.9	1434.2	1234.1	5212.2	

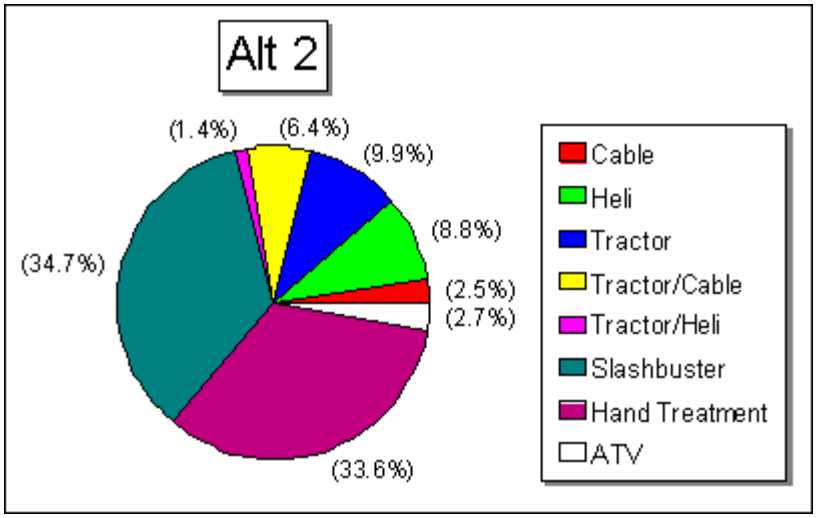
Alt 3	Big Butte Middle	Big Butte Lower	McNeil Cr. LBB		Big Butte - 5th
Treatment					
DM	417.4	18.3	253.7	689.4	
DM-Slash buster	47.7	96.2	265.6	409.5	
DM-slash/pile/burn	0	0	0	0	
NGFMA Regen	27.4	0	0	27.4	
SGFMA Regen	0	0	0	0	
Select Cut	105.2	9.6	19.6	134.4	
Shelterwood	0	0	0	0	
Thin	0	0	0	0	
Underburn	78.4	174.2	150.5	403.1	
Understory Thin	472.3	646	119.2	1237.5	
Meadow Burn	347.2	45.5	16.3	409	
Slashbuster/burn	937	236.5	282.1	1455.6	
slash/handpile/burn	37.5	207.9	66.9	312.3	
Hardwood Conversion	0	0	0	0	
Total Acres	2470.1	1434.2	1173.9	5078.2	4536.9
Total WS Acres	12492	7644	16288	43814	157776
Total percent of WS	19.8	18.8	7.2	11.6	2.9
Logging System					
Cable	32.3	9.6	29.25	71.15	
Heli	210.7	0	185.1	395.8	
Tractor	306.95	14.5	81.25	402.7	
Slashbuster	984.7	332.7	547.7	1865.1	
Hand Treatment	900.3	1065.9	320.9	2287.1	
ATV	35.1	11.5	9.7	56.3	
Total Acres	2470.05	1434.2	1173.9	5078.15	

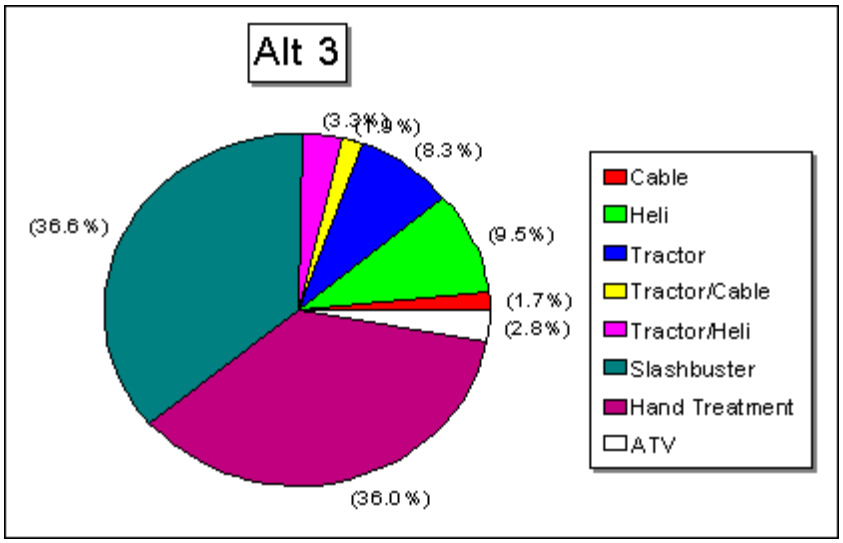
Alt 5	Big Butte Middle	Big Butte Lower	McNeil Cr. LBB		Big Butte - 5th
Treatment					
DM	164.5	24.8	187.6	376.9	
DM-Slash buster	47.7	96.2	288	431.9	
DM-slash/pile/burn	0	0	0	0	
NGFMA Regen	0	0	0	0	
SGFMA Regen	0	0	0	0	
Select Cut	0	0	0	0	
Shelterwood	0	0	0	0	
Thin	0	0	0	0	
Underburn	78.4	174.2	150.5	403.1	
Understory Thin	533.1	649.1	108	1290.2	
Meadow Burn	348.5	45.5	16.3	410.3	
Slashbuster/burn	937	236.5	282.1	1455.6	
slash/handpile/burn	37.5	207.9	66.9	312.3	
Hardwood Conversion	0	0	0	0	
Total Acres	2146.7	1434.2	1099.4	4680.3	4106.4
Total WS Acres	12492	7644	16288	43814	157776
Total percent of WS	17.2	18.8	6.7	10.7	2.6
Logging System					
Cable	0	9.1	6.65	15.75	
Heli	92.2	0	124.6	216.8	
Tractor	72.3	11.9	78.65	162.85	
Slashbuster	984.7	332.7	570.1	1887.5	
Hand Treatment	940.1	1069	309.6	2318.7	
ATV	57.4	11.5	9.7	78.6	
Total Acres	2146.7	1434.2	1099.3	4680.2	

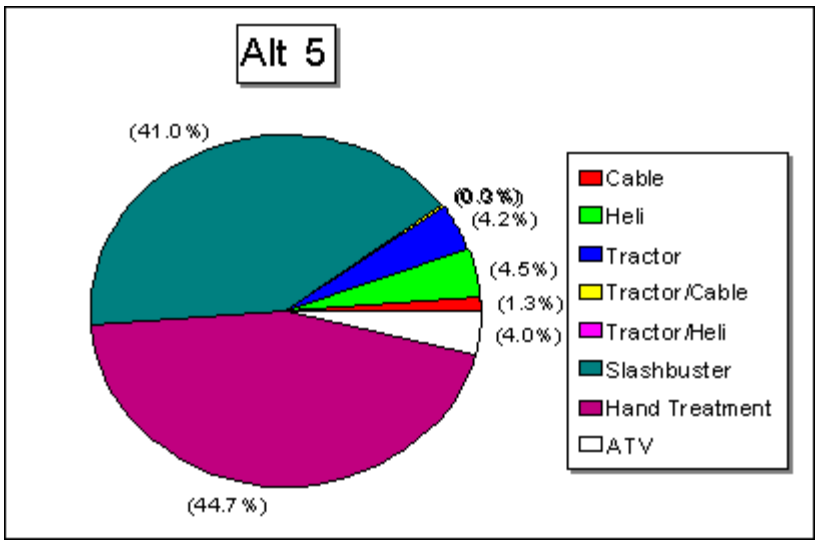
ROADS

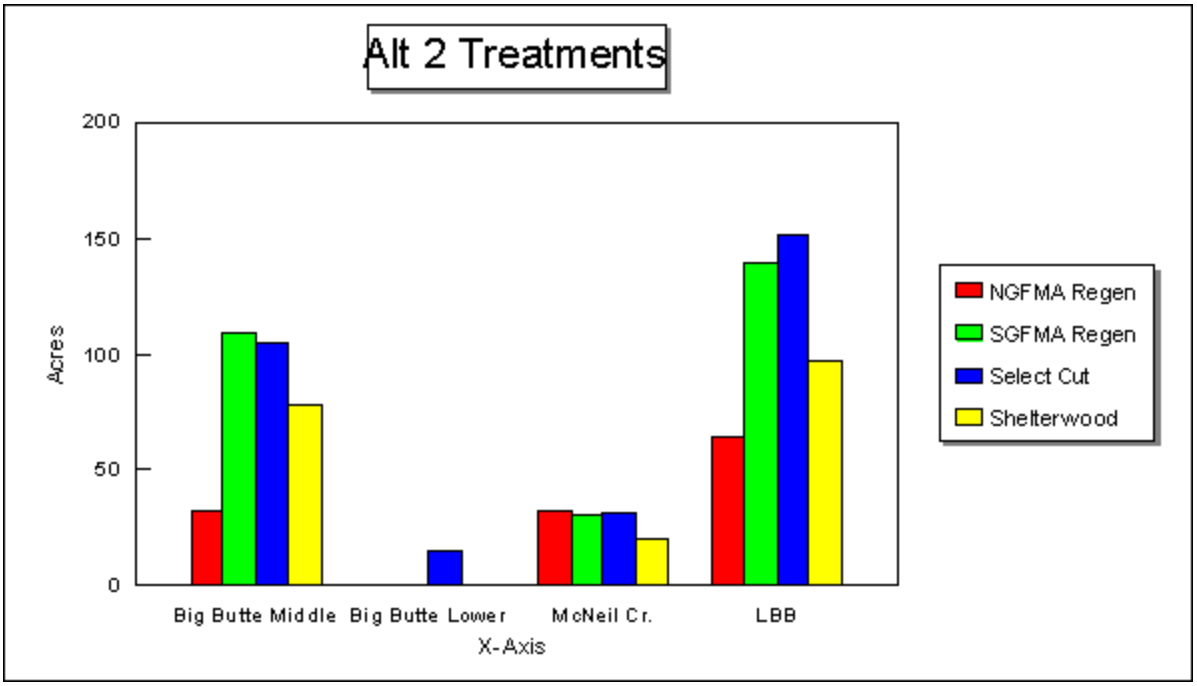
Big Butte Middle	Big Butte Lower	McNeil Cr.	Clark Cr.	LBB
4.1	3.7	4.6	5.5	4.5

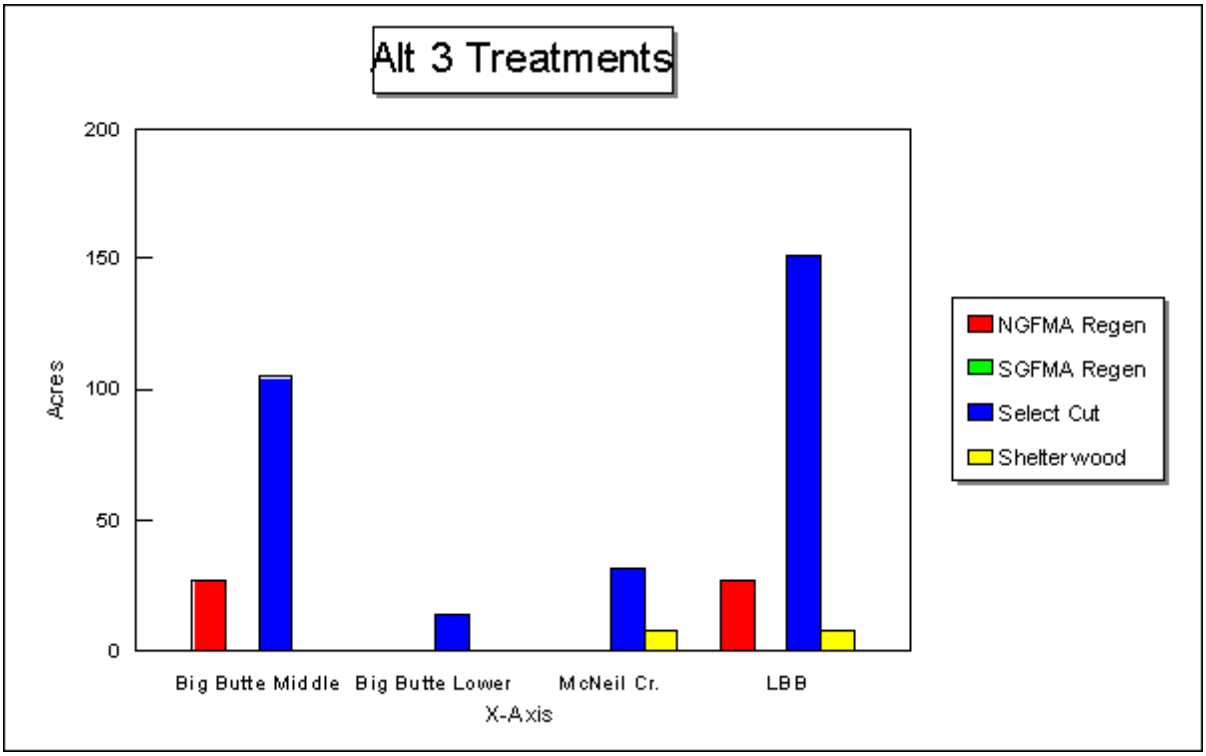
Lower Big Butte	Alt 2	Alt 3	Alt 5
Existing Gated	8.03	8.03	8.03
Improvement	7.67	7.67	7.67
New Permanent	0.94	0.51	0.07
New Temporary	2.46	0.74	0
Renovation	29.47	29.47	29.47
Temporary Block	20.23	20.23	20.23
Partial Decommission	1.74	1.74	1.74
Full Decommission	1.3	1.3	1.3

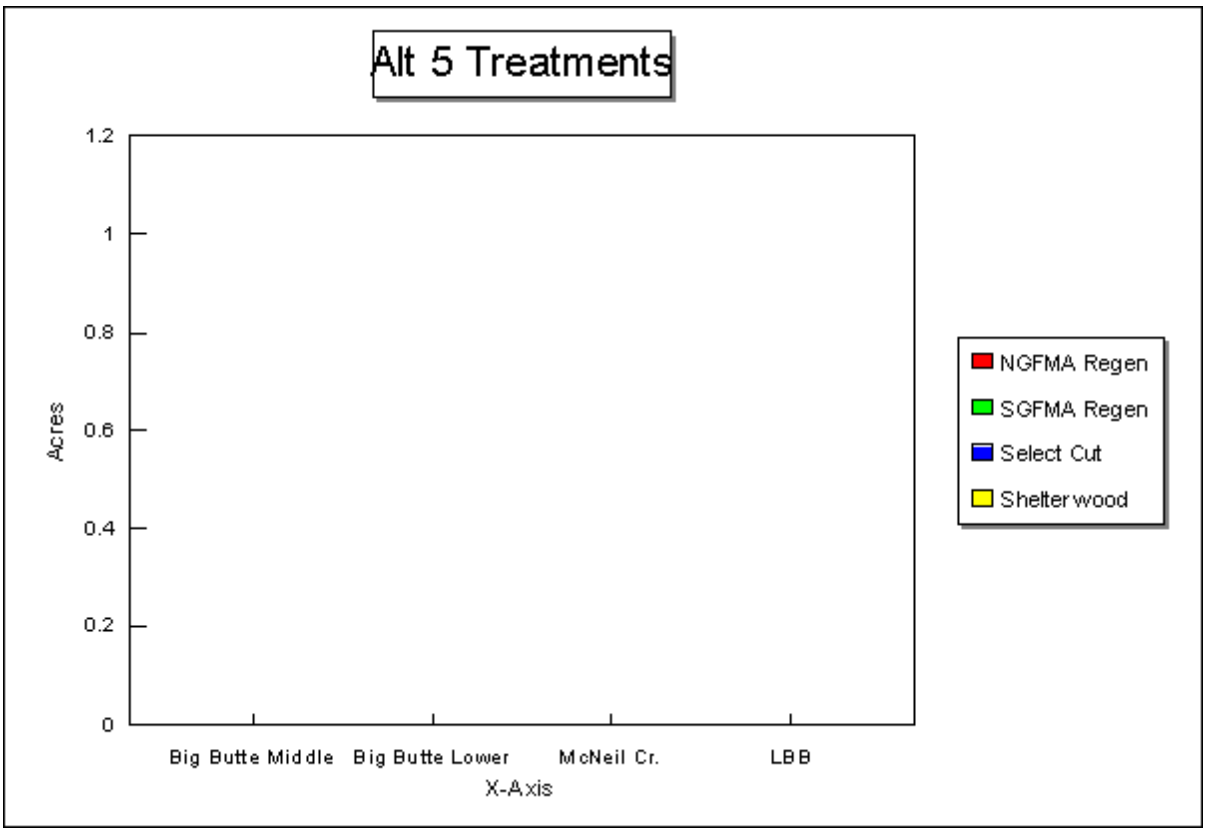

Alt 2
(1.4%)
(6.4%)
(9.9%)
(8.8%)
(34.7%)
(2.5%)
(2.7%)
(33.6%)
Cable
Heli
Tractor
Tractor/Cable
Tractor/Heli
Slashbuster
Hand Treatment
ATV


Alt 3
(8.3%)
(9.5%)
(36.6%)
(1.7%)
(2.8%)
(36.0%)
Cable
Heli
Tractor
Tractor/Cable
Tractor/Heli
Slashbuster
Hand Treatment
ATV


Alt 5
(41.0%)
(4.2%)
(4.5%)
(1.3%)
(4.0%)
(44.7%)
Cable
Heli
Tractor
Tractor/Cable
Tractor/Heli
Slashbuster
Hand Treatment
ATV


Alt 2 Treatments
200
150
100
50
0
Acres
Big Butte Middle
Big Butte Lower
McNeil Cr.
LBB
X-Axis
NGFMA Regen
SGFMA Regen
Select Cut
Shelterwood


Alt 3 Treatments
200
150
100
50
0
Acres
Big Butte Middle
Big Butte Lower
McNeil Cr.
LBB
X-Axis
NGFMA Regen
SGFMA Regen
Select Cut
Shelterwood


Alt 5 Treatments
1.2
1
0.8
0.6
0.4
0.2
0
Acres
Big Butte Middle
Big Butte Lower
McNeil Cr.
LBB
X-Axis
NGFMA Regen
SGFMA Regen
Select Cut
Shelterwood

Appendix H

AFFECTED ENVIRONMENT- SOILS

Soils Description

Timber Harvest

Soils in the project area have formed in alluvial and colluvial materials derived from weathered volcanic rocks that are mostly andesite, tuffs, and breccias. The parent materials of these soils greatly influence their physical properties and their response to disturbance from management activities. (See Lower Big Butte Watershed Analysis pages 15, 16, 41, 49, 57 &58)

Subsoil textures of soils within the project area are typically clay loams, gravelly clay loams or clays and gravelly clays of varying mineralogy. Soil texture and mineralogy in the subsoil influence soil properties such as water holding capacity, compaction potential, and slope stability. Surface textures are typically loams or clay loams with varying amounts of gravel, cobbles, and stones. Surface textures mainly influence infiltration rates, runoff, and surface erosion. Soil depths range from shallow (<20" to bedrock) in meadows to very deep (60"+) in conifer forests. Soil depth mainly affects rooting depth of the vegetation and water holding capacity of the soil. Topography ranges from steep canyon side slopes (50-60%) to mildly sloping plateaus (2-5%). The steepness of the slope is a dominant factor in the potential for surface runoff, soil erosion and slope stability. All of these properties influence the productivity of the soils, the potential for soil erosion, and the potential for off-site sedimentation.

The McNull and Medco soil series have montmorillonitic clay mineralogy which have high shrink-swell potential. These soil types have been shown to be susceptible to compaction and slope failure. The McNull soil is typically found in conifer forest stands. The Medco soils are found in conifer and hardwood forest stands and oak grasslands.

The Freezner, Hukill, and Geppert soil series also have clay amounts greater than 35% in the subsoil, however, the clay mineralogy is mixed and not as prone to shrink-swell and is not as restrictive to management activities as are the montmorillonitic clays. These soils are typically found in conifer forest stands.

The Geppert soil is also very cobbly (> 35% cobbles in the subsoil) which reduces the water holding capacity and the effectiveness of tillage operations. This soil is typically found in conifer and hardwood forest stands.

The McMullin soils are shallow (less than 20" to bedrock) and skeletal (>35% rock fragments in the subsoil). Shallow rocky soil properties limit productivity and subsequent conifer growth. These soils are typically found in rocky and brushy meadows and as small inclusions in conifer forest stands.

The most extensive source of sedimentation comes from the network of roads, landings, and skid trails throughout the project area (see Lower Big Butte W.A. pg._15_). All soil types potentially contribute to this cumulative effect. However, the Medco, McNull, and Carney clay soils are more susceptible to road related slumping which can increases the risk of sedimentation in local stream channels.

When considering the effects of land management practice on soil erosion, the most influential

factors are: the type of management practice, the geology, the geomorphology, soil type, and the timing of major storms. Identifiable factors like soil type, topography, and geologic materials along with the type of forest practice help to predict the potential risks of soil erosion. However, the timing and intensity of subsequent rain storms is the most important factor in how much erosion might occur. It is also the most unpredictable of these factors. Because of this unpredictability and the high variability of the other factors, quantification of soil erosion from individual timber harvest or treatment units is not feasible. For this reason, these types of effects are expressed in terms of expected risk levels and are not quantified. In analyzing for these effects, conclusions are based on the assumption that the project design features, restoration projects, and proposed mitigating measures will be appropriately implemented.

Fuels Treatment

Prescribed Fire
Soil characteristics having the most influence on potential adverse impacts (long-term loss of soil productivity) from fire are the thickness of duff (organic) layer and the soil depth. Therefore, soils that are shallow (<20" deep) and/or that have thin duff layers (<1" thickness) are most susceptible to adverse impacts from fire. The McMullin soil is typically shallow and has a thin duff layer. The Medco soil is moderately deep but usually has a duff layer approximately 1"-½" in depth. Carney clays usually have thin duff layers. The other soils with the project area have characteristics (deeper profiles, thicker duff layers) that make them less susceptible to fire effects.

Mechanical (Slash Buster)
Soil characteristics that influence the amount of adverse impact from mechanical equipment are soil texture, soil moisture content, and steepness of slope. Typically, the greater amount of clay in the soil the more susceptible to compaction it is. Also, soils with greater amounts of clay typically hold more water for longer periods. Soils with slopes greater than 35% are most susceptible to runoff and erosion in areas disturbed by mechanical equipment. Medco and Carney soils have high clay content (>35%) and are most susceptible to compaction. All soil types are susceptible to runoff and erosion from disturbance on slopes greater than 35%.

Issues Analyzed in Detail Not Identified in the Watershed Analysis
Although soil compaction and resulting soil productivity losses is considered and discussed in this assessment it was not a soil effects issue identified in the Lower Big Butte W. A. With the exception of the Clark Creek Drainage which has been deferred from timber harvest activities for a high level of cumulative effects for transient snow zone effects and soil compaction, the Lower Big Butte watershed (LBB WA pg.16) is at a low level of risk for soil productivity losses associated with compaction for the remaining portion of the project area.. Cumulative effects analysis for soil compaction were conducted utilizing aerial photo interpretation in1993 on both federal and private managed lands in the LBB Watershed Analysis.
Implementation of the PDFs (proposed for all action alternatives) and completion of proposed restoration projects (pg.– of this EA) are also expected to adequately keep and restore soil compaction to acceptable levels as per the standards identified in the Medford DFO RMP/EIS ppg. 4-13 vol. 1.

ENVIRONMENTAL CONSEQUENCES

Timber Harvest Project Effects - Soils

1. Alternative 1 - No Action

a) Direct and Indirect Effects

This alternative would not directly change any effects on the soil resource as describe in the existing condition. Indirectly, soil erosion and subsequent sedimentation from roads that are currently eroding would continue, if proposed road improvements and decommissioning did not occur.

b) Short-term Uses vs. Long-term Productivity

There would be no change in soil productivity levels from implementation of this alternative. Indirectly, areas identified as having high fire hazard that are recommended for fuels treatment would continue to be at risk for high intensity wild fires. Wild fires have the potential to extensively reduce long-term soil productivity within the project area.

c) Irreversible/Irretrievable Commitments of Resources

There would be no irreversible or irretrievable commitment of the soil resource from implementation of this no action alternative.

d) Cumulative Effects

There would be no change in cumulative effects on the soil resource from implementation of this alternative. The soil resource would continue to be at a high level of risk for soil productivity losses and subsequent sedimentation of local stream channels resulting from a high intensity wild fire.

2. Alternative 2

a) Direct and Indirect Effects of the Timber Harvest Activities

Adverse effects on the soil resource from timber harvest comes primarily from ground disturbance during yarding, site preparation, and road and landing construction activities. More specifically, heavy equipment operations (tracked vehicles) have the greatest potential to cause displacement and compaction of the soils. Exposed and displaced soil material is subject to detachment and transportation during periods of runoff. This soil erosion can adversely affect soil productivity and

increase sedimentation rates in streams. This effect is expected to diminishes over time (typically 1-3 years) as the soil stabilizes and becomes re-vegetated. Waterbarring tractor skid trails with appropriate spacing and construction, 35% slope restrictions, and maintaining riparian reserves reduces the potential for runoff and subsequent sediments from reaching stream channels. See hydrology discussions in this E.A. for road related sediment effects.
Soil compaction also reduces soil productivity by adversely altering physical properties of the soil. It is well documented that ripping (tilling with winged-tooth rippers or a subsoiler) compacted soil *(Froehlich, H. A., and D.W.R. Miles. 1984 Winged subsoiler compacteed forest soil. Forest Industries 111(2):42-43) and restricting the amount of area disturbed by utilizing designated skid trails (Froehlich, H.A. and McNabb. 1984 Minimizing Soil Compaction in Pacific Northwest Forests. P 159-192. In: Earl Stone (Ed.) Forest Soils and Treatments Impacts. Proc. of Sixth North American Soils Conference. Univ. of Tenn. Conferences, 2016 Lake Ave. Knoxville. June1983.) is the most effective means of ameliorating this effect (see pg. 166 of the MFDO ROD/RMP for recommended BMPs). It is expected that previously described direct effects on the soil resource from mechanical disturbance will occur with this proposed action. With regard to soil erosion, the effects are anticipated to be short-term (1-3 years). It is also expected that with the implementation of the proposed PDFs (see PDFs common to action alternatives) that soil erosion and compaction effects will be minimized to a risk level that will comply with objectives and recommendations identified in the LBB WA (pg.57-58), MDFO ROD/RMP (ppg, 44 & 166-168) and the Aquatic Conservation Srategy ACS (pg.B-11 #5 S&Gs ROD).

b) Short term Uses vs. Long term Productivity Losses

Soil productivity loses are expected to occur from soil compaction and erosion. It is expected that with the implementation of the PDFs and the proposed restoration projects (road decommission) that the overall soil productivity losses would be within identified objectives. (See direct and indirect effects discussion on soil compaction).

c) Irretrievable/Irreversible Commitment of Resources

Soil material lost through erosion would be considered irretrievable but not irreversible. It is expected that these amounts will be small and immeasurable. (See discussions for direct and indirect effects on soil erosion).

d) Cumulative Effects

The effects of soil erosion and soil compaction as discussed in the direct and indirect effect section of this alternative are expected to add to the current condition as described in the LBB Watershed Analysis (pp 15-16). It is expected that some areas disturbed by logging activities will experience soil erosion. In particular, tractor yarding units will have the greatest risk for this effect. Under this alternative, approximately 551 acres would be tractor yarded.. Approximately 328 (60%) of the acres proposed for tractor yarding will have the skid roads ripped to ameliorate compaction, reduce runoff, and expedite vegetative recovery. The remaining tractor acres (223) are in harvest units proposed for thinnings, density management, and select cuts where designated skids roads are

anticipated to be used for future treatments(within the next 5-10 years). The implementation of the PDFs (see direct and indirect effects discussion) particularly designated skid roads and maintaining riparian reserves are expected to keep soil erosion and subsequent sedimentation of streams to low risk levels. This alternative will have a slightly greater degree of cumulative risk when compare to alternatives 3 and 4.

3. Alternative 3 Soil

a) Direct and Indirect Effects of Timber Harvest Activities

Direct and indirect effects for site specific treatment areas with regard to the soil resources are expected to be the same as those described in alternative 2.

b) Short term Uses vs. Long term Productivity

Same as those identified in alternative 2 except with fewer tractor acres (433). It is not expected that there will be a measurable change in soil productivity losses between this altemative and alternative 2.

c) Irretrievable/Irreversible Commitment of Resources

Same as Alternative 2.

d) Cumulative Effects

The risk level for cumulative effects on the soil resource is expected to be the same as those described in Alternative 2. Tractor yarding acres will be approximately 433 with 134 acres (31%) proposed for the skid roads to be ripped. The remaining 299 acres will utilized designated skids roads laid out with approximately 150 ft. spacing to kept disturbance levels to under 10% of total unit acreage (see PDFs for all action alternatives).

4. Alternative 4

a) Directs and Indirect Effects of Timber Harvest Activities

The same effects identified in alternative 2 are expected to occur in this proposed alternative. The level of risk from these effects are expected to be somewhat less however. This is primarily because a greater percentage of timber harvest acres will be helicopter yarded (55% for Alt.4 vs. 33% for Alt. 2) and less than half the amount of tractor yarding (192 acres) is proposed.

b) Short term Uses vs Long term Productivity Losses

Same type of effects as alternative 2. Same level of risk as in direct and indirect discussion of this

alternative.

c) Irretrievable/Irreversible Commitment of Resources

Same as Alternative 2.

d) Cumulative Effects

Same type of effects as described in Atl. 2. Risk levels are expected to be less than both Alt. 2 and 3 because of considerably less tractor yarding (192 acres) and more helicopter yarding (see direct and indirect discussion).

Fuels Treatment Project-Soil Effects for All Action Alternatives

a) Direct and Indirect Effects

Adverse effects of fire on soils from prescribed burning can occur when the organic surface (duff) layer is consumed or when surface temperatures become hot enough to destroy soil microorganisms. Removal of the duff layer interrupts soil nutrient recycling and can adversely affect long term soil productivity. Significant reduction or removal of beneficial microorganisms (e.g. bacteria, fungi) in the soil profile can also reduce long term soil productivity.
The extent of adverse effects on soil productivity from fire is primarily dependant on the duration and intensity of the heat produce during the fire. The amount (size and distribution) of fuels, the moisture content of fuels, the type of fuels (plant species) present, and weather conditions are the dominant factors that can influence the intensity and duration of a fire. The amount of duff layer, the soil moisture content, and soil texture are the dominant soil characteristics that can determine the extent of damage to the soil.

Direct effects on the soil resource could come from the removal of the duff layer during burning operations and soil disturbance from the construction of tractor firelines and slash buster treatment areas. With the implementation of the following PDFs; low intensity and short duration fires as designed by the burn plans (refer to PDFs and Burn Plan Design of this E.A.), 35% slope restriction and 25% soil moisture limitations for mechanical equipment, waterbarring of tractor firelines, and re-seeding efforts to re-establish native grasses on exposed soil areas, soil erosion and subsequent sedimentation of nearby stream channels is expected to be short term and minimal. For specific acreage by treatment, watershed, and soil type refer to appendix __.

b) Short term Uses vs Long term Productivity Losses

Soil productivity losses could occur in areas where the fire consumes the duff layer. With the implementation of the PDFs (particularly low intensity, short duration fires with low fuel loadings) designed in the prescribed burning plan, it is expected that long term productivity losses will be

negligible. This conclusion is based on research data that indicates short duration low intensity prescribed fires typically don't consume harmful amounts of the duff layer and little or no soil nutrients are volatilize (Fire Effects On Pacific Northwest Forest Soils, 1980, Donald E. Boyer and John D. Dell, Forest Service USDA Pacific Northwest Region, pp 29-33).

Soil productivity losses could also occur from soil compaction and displacement during mechanical fuels treatment. The same PDFs identified under the direct effects discussion along with requiring the mechanical equipment to stay on existing slash where possible are expected to keep soil productivity losses at a low level of risk.. Although little research data exist specifically on the effects of compaction and displacement of soils from slash buster equipment, recent slash buster treatments analyzed in the Butte Falls RA have indicated low amounts of ground disturbance and soil compaction (Draft Report Geppert Butte Fuels Treatment Area by Annette Parsons BLM 7/10/00).

c) Irreversible/Irretrievable Commitment of Soil Resource

Same as proposed timber harvest alternatives.

d) Cumulative Effects

The effects described in the direct and indirect discussion of this proposed treatment are expected to add to effects previously identified in the current condition section of the LBB WA (pp15-16) The spatial and temporal distribution of the proposed fuel treatments, the proposed restoration projects, and the implementation of the PDFs are expected to keep additive effects of soil erosion and soil compaction and displacement to acceptable levels and meet the soil objectives identified in the Aquatic Conservation Strategy(ACS), Lower Big Butte Watershed Analysis (LBB WA) and the Medford FDO EIS/RMP. The incremental increase of these effects will add to the current condition discussed in the LBB WA (ppg. 15-16) and the effects of the proposed timber harvest actions discussed in this document.
In coming to this conclusion from a landscape perspective, consideration was given to the potential benefits of reducing the risk of wild fires on the soil resource (long term) verses the potential adverse effects of the proposed treatments on the soil resource (short term).

SOIL CHARACTERISTICS FOR ALL PROPOSED TIMBER HARVEST UNITS

Unit #'s	Soil Series	Soil Depth	Surface Texture	Subsoil Texture	Percent Slope
12-1 ,7-4, 7-2, 7-3, 18-3, 18-4, 17-2, 19-6, 19-5, 9-1, 9-3, 17-1, 35-1, 34-2, 33-2, 35-2, 3-3, 3-2, 1-2, 3-1, 1-4, 1-3, 3-6, 3-5, 7-1	McNull	moderately deep 20-40"	loam	clay loam	12-35
9-2, 15-1, 19-1, 34-4, 33-1, 1-1, 1-4, 3-4, 10-1, 10-2, 18-5	McNull	moderately deep 20-40"	gravelly loam	clay loam	35-60
16-1, 16-2, 16-3, 19-4, 19-2, 29-1, 33-4, 34-1, 11-1, 17-3	Freezner	very deep 60"+	gravelly loam	clay loam	12-35
18-1, 19-3, 25-1, 11-2	Freezner	very deep 60"+	gravelly loam	clay loam	1-12
22-1, 21-1	Freezner	very deep 60"+	gravelly loam	clay loam	35-60
25-2, 25-7, 25-6, 25-3, 25-5, 25-4, 33-3, 34-3	Hukill	deep 20-40"	gravelly loam	gravelly clay	1-12
28-1, 9-5, 9-4, 17-4	Geppert	moderately deep 20-40"	very cobbly loam	extremely cobbly clay loam	35-60
16-2, 35-3, 18-6, 18-7	Medco	moderately deep 20-40"	clay loam	clay	7-12
28-3	McMullin	shallow 12-20"	gravelly loam	gravelly clay loam	35-60

SOIL CHARACTERISTICS FOR PROPOSED FUEL TREATMENTS UNITS

Unit # 's	Soil Series	Soil Depth	Surface Texture	Texture Subsoil	Percent Slope
SB-9, SB-8, SB-10, UB-3, DM-SB-6, DM-SB-5, HP-2, SB-14, DM-SB-3, SB-3, SB-16, DM-HP-1, SB-13, SB-7, DM-HP-6, SB-2, SB-5, SB-15, SB-4, UB-2	Medco-McMullin complex	10-40"	cobbly clay loam, gravelly loam	clay, gravelly clay loam	12-50
HP-6, DM-HP-2, SB-12, DM-HP-4, DM-HP-1	McNull-Medco complex	20-40"	gravelly loam, cobbly clay loam	clay loam, clay	12-50
HP-5, DM-SB-4, SB-11, MB-1	McMullin-Rock complex	< 20"	gravelly loam, rock	gravelly clay loam	3-35
DM-SB-1, DM-SB-2	McNull	20-40"	gravelly loam	clay loam	12-35
SB-6	Medco	20-40"	cobbly clay loam	clay	12-50
HP-1	McNull-McMullin complex	20-40", <20"	gravelly loam	clay loam, gravelly clay loam	35-65
HP-4	Carney	20-40"	clay	clay	5-20

UB= under burn, SB= slash buster, HP= hand pile, DM= density management, MB= meadow burn

Appendix I final version 5/29/01
APPENDIX I - STAND INVENTORY SUMMARY TABLE - LOWER BIG BUTTE

DEFINITIONS:

1. T-R-Section
Township-Range-Section, the geographic location of the area.

2. OI Unit
Operational inventory (OI) unit number. Represents an identified stand of trees with similar characteristics.

3. BA SQFT
Basal area in square feet (BA SQFT) is a measure of area occupied by tree boles at 4.5 feet above ground level. This measure provides an indicator of tree crowding.

4. RD
Relative Density (RD) is a measure of crowding to indicate levels of competition in a stand of trees It compares the number of existing trees to the number of trees the site has resources (water, nutrients, sunlight) to support. At a relative density of 25% site occupancy by trees occurs. At a relative density of 35% the onset of competition for resources begins to occur. Stand vigor and growth is maximized at relative densities ranging from 35% to 50%. Once a stand of trees reaches a relative density of 60% or greater than the following conditions begin to occur:
*Competition related mortality becomes significant.
*Self thinning starts.
*Decline in growth.
*Volume growth/acre is offset by mortality.
*Increased susceptibility to insect attack and disease infection.

5. ROD CWD LFT/A
Linear feet per acre (LFT?AC) of decay class 1&2 coarse woody debris (CWD) that is at least 16" on the large end by 16" in length ad defined in the Record of Decision (ROD C-40).

6. SNAGS/AC, STAGE 1&2, >16"
Number of dead standing stage 1&2 trees per acre greater than 16" diameter at breast height.

STAND SUMMARY DATA (MATRIX LANDS)

TR	SECTION	OI_UNIT_	ACRES	TOTAL VOLUME/ACRE BOARD FEET	BA SQFT	RD	ROD CWD LFT/A	SNAGS/AC STAGE 1&2 >16"
34S-01E	10	8	9	38086	287	0.92	~	
34S-01E	15	1	15	15958	150	0.64	~	
34S-01E	25	4	20	39316	214	0.77	~	3
34S-01E	25	5	13	39316	214	0.77	~	3
34S-01E	25	6	16	78741	362	1.1	68.4	
34S-01E	25	7	28	33949	221	0.77	~	0.8
34S-01E	25	8	20	78741	362	1.1	~	
34S-01E	25	9	12	42320	270	1.4	~	
34S-01E	33	4	10	9159	186	0.77	~	
34S-01E	35	2	10	17750	162	0.51	~	
34S-01E	35	3	17	32228	240	0.87	~	1.7
34S-01E	35	6	12	16785	130	0.46	~	1.6
34S-02E	9	2	45	34648	215	0.84	93	
34S-02E	16	5	104	24522	214	0.75	~	
34S-02E	16	6	10	20961	207	0.81	~	
34S-02E	16	6	13	20961	207	0.81	~	
34S-02E	17	4	30	24949	231	0.85	~	
34S-02E	18	2	9	26768	164	0.63	~	
34S-02E	18	5	10	27475	243	0.9	~	4
34S-02E	19	3	23	33187	191	0.74	~	
34S-02E	19	4	7	27475	243	0.9	~	4
34S-02E	19	6	13	15426	183	0.72	~	
34S-02E	19	6	43	23201	182	0.81	114	
34S-02E	19	8	18	26888	196	0.71	~	
34S-02E	21	6	12	52632	200	0.78	228	2.8
34S-02E	21	11	19					2.8
34S-02E	22	2	24	31607	178	0.6	171	1.3
34S-02E	23	6	23	60595	228	0.75	137	
34S-02E	28	1	50	60803	259	0.89	34	3
34S-02E	28	9	5	63495	357	1.29	~	
34S-02E	29	1	42	30249	187	0.66	~	0.7
34S-02E	33	3	10	59458	265	0.96	~	
34S-02E	33	6	5					
34S-02E	33	7	27	26893	151	0.65	~	0.8
34S-02E	34	1	55	16576	184	0.67	~	
34S-02E	34	2	13					

Appendix J Final version

Appendix J - ALTERNATIVES CONSIDERED BUT ELIMINATED

Alternative 4 - The following alternative was developed but dropped from further consideration because the treatment units and type of treatment activity, identified for this alternative, are incorporated into either existing action alternative 2 or 3. Additionally some units (identified for treatment in this alternative), were found to be inappropriate for treatment as proposed. This is due to VRM II classifications and or meadow buffer requirements. As a result the level at which issues are addressed by this alternative, are adequately covered by the existing action alternatives.

ALTERNATIVE 4 - MODIFIED ROD STANDARDS AND GUIDELINES

The intent of this alternative is to achieve the goals, objectives, and desired future condition for the watershed as specified in the Northwest Forest Plan, the Medford District Resource Management Plan and Lower Big Butte Watershed Analysis. This alternative emphasizes development and retention of mature seral conditions. Treatment of mature seral stands occurs where significant productivity losses are expected due to insect and disease. Based on the Lower Big Butte watershed analysis, mature seral stands identified as important old growth habitat are retained. This alternative includes the projects described below.

a) Timber Harvest.

The overall scope of this action alternative covers approximately 1132 acres of BLM managed lands designated Matrix. Matrix lands include Southern General Forest Management Areas, Northern General Forest Management Areas and Connectivity/Diversity Blocks. Approximately 12 acres of withdrawn lands within the Southern General Forest Management Area would also be treated as a part of proposed fuels treatment activities within the urban interface. This action consists of seven silvicultural methods:

1. Commercial thinning/Density management of 677 acres where individual small trees are removed from dense stands. Retention of remnant mature overstory trees is emphasized under this alternative to provide structural diversity. Removal of remnant trees under this alternative will occur for reduction of insect and disease risks or enhancement of species diversity. At least 40% canopy closure would be retained.

2. Understory reduction of 80 acres where individual small trees are removed from dense mid-seral stands (stands averaging 5" to 11" d.b.h.), in order to redistribute growth to vigorous dominant and codominant trees. Treatment includes removal of miscellaneous forest products such as post and poles from approximately 51 acres. At least 40% canopy closure would be retained.

3. Selection cutting of 174 acres that remove individual or small groups of trees from all diameter classes. At least 40% canopy closure would be retained. Planting of conifer seedlings would occur in poorly stocked areas following harvest.

4. Structural retention regeneration harvest of 75 acres, retaining a minimum of 16-25 trees per

acre greater than 20 inches d.b.h. All but exceptionally vigorous trees less than 20 inches d.b.h. would be removed. The residual canopy closure would be approximately 25-40%. Planting of conifer seedlings would occur following harvest.

5. Shelterwood retention regeneration harvest of 31 acres, retaining a minimum of 12-25 trees per acre greater than 20 inches d.b.h. All but exceptionally vigorous trees less than 20 inches d.b.h. would be removed. The residual canopy closure would be approximately 20-40%. Planting of conifer seedlings would occur following harvest.

6. Modified even-aged regeneration harvest of 44 acres, retaining a minimum of 6-8 trees per acre greater than 20 inches d.b.h. All but exceptionally vigorous trees less than 20 inches d.b.h. would be removed. Canopy closure would be approximately 10-15%. Planting of conifer seedlings would occur following harvest.

7. Hardwood conversion of 49 acres where competing hardwood trees are removed in order to promote additional establishment of conifers and redistribute growth to existing dominant and codominant conifers. Depending on the site, all hardwoods less than 12 inches or 14 inches would be removed. The residual canopy closure would be approximately 25 to 40%. Planting of conifer seedlings would occur following harvest.

Alternative A-1 - Approximately 176 acres of matrix lands were originally considered for harvest entry but eliminated from consideration due to current stand conditions, inaccessibility, unstable soils or wildlife concerns. All or portions of the following operational inventory units were deferred from entry at this time.

Township-Range-Section	OI Unit	Acres	Remarks
34S-1E-23	003	5	Treatment area is landlocked and isolated from other harvest areas. Preferred treatment for stand vigor is a regeneration harvest. Density management only provides marginal improvement to the existing stand condition. RMP direction is to allow for stand development to 150 years where possible. Defer treatment due to high treatment costs, stand age and lack of access.
34S-1E-23	007	6	Treatment area is adjacent to a natural opening where buffering is required for potential great gray owl habitat. A 300 foot buffer eliminates most or all of the treatment area.

34-2E-19	003 006	23 12	Treatment area surveys have identified special status buffering requirements to provide for resource protection.
Township-Range-Section	OI Unit	Acres	Remarks
34S-2E-21	014	13	Treatment area is matrix land within a connectivity block. Review identified that stand conditions meet late successional requirements and treatment would result in fragmenting the designated late-successional reserve adjacent to the treatment area. IDT decision to defer treatment to maintain connectivity values.
34S-2E-21 34S-2E-22	011 002	31 24	Treatment areas are within visual resource management class II and treatment in section 21 is within a connectivity block. Regeneration requirements are to retain 12-25 TPA > 20". Current stand conditions are such that regeneration harvest is needed but retention requirements cannot be provided due to overstory mortality.
35S-2E-07 35S-2E-09	001 001 003 005 006 007	3 12 10 6 5 4	Treatment areas are adjacent to a natural opening where buffering is required for potential great grey owl habitat. A 300 foot buffer eliminates most or all of the treatment area.
35S-2E-17	002	22	Deferred due to sensitive soils classification and requirement to manage under southern general forest management guides. Stand age is 110 years and will be stable to desired rotation age of 150 years.

Alternative A-2 - Approximately 483 acres of forested, non-commercial woodland sites and brush fields were originally considered for density reduction and/or fuel reduction treatments. These are low productivity sites with high stocking levels or are lightly forested with seral pine species where dense brush has resulted in continuous ladder fuel development. Treatment was considered to promote individual tree vigor, favor development and retention of pine species and reduce the risk of stand replacing wildfire. Treatment of these units were eliminated from consideration due to inaccessibility, the desire to retain existing wildlife habitat conditions, avoidance of potential short-term effects to riparian buffers and/or the unit was not considered a high priority with respect to wildfire risks from the urban interface. All or portions of the following operational inventory units were deferred from entry at this time but are identified as possible restoration opportunities should treatment be considered appropriate with future entries into the watershed.

TR	SEC	OI_UNIT	ACRES		TR	SEC	OI_UNIT	ACRES
34S-01E	11	7	2		34S-02E	28	4	56
34S-01E	15	2	40		34S-02E	29	3	28
34S-01E	15	12	35		34S-02E	29	4	12
34S-01E	15	13	13		35S-01E	10	2	9
34S-01E	15	14	31		35S-01E	10	3	6
34S-01E	25	3	7		35S-01E	10	4	8
34S-02E	18	1	55		35S-02E	9	2	21
34S-02E	18	3	26		35S-02E	9	4	20
34S-02E	18	4	43		35S-02E	17	1	38
34S-02E	21	13	11		35S-02E	17	8	23

34S-02E	34	4	9	33728	268	0.99	~	1.4
TR	SECTION	OI_UNIT_	ACRES	TOTAL VOLUME/ACRE BOARD FEET	BA SQFT	RD	ROD CWD LFT/A	SNAGS/AC STAGE 1&2 >16"
34S-02E	34	4	13	33728	268	0.99	~	1.4
35S-01E	1	1	15	41448	253	0.75	~	
35S-01E	1	2	10	28834	212	0.69	~	
35S-01E	1	4	46	25295	217	0.8	~	1.1
35S-01E	1	9	10	58068	240	0.59	45.6	
35S-01E	3	3	13	33936	241	0.76	~	1.6
35S-01E	3	5	7	26181	187	0.64	~	
35S-01E	3	5	14	15909	173	0.63	~	
35S-01E	3	6	5	25546	201	0.82	~	
35S-01E	3	6	6	25546	201	0.82	~	
35S-01E	10	1	7	19694	213	0.74	~	5.6
35S-01E	10	1	9	15909	173	0.63	~	
35S-01E	11	1	30	68765	322	1.24	~	0.2
35S-01E	11	2	25	39884	312	1.04	~	
35S-01E	11	3	10	12015	249	0.86	~	
35S-01E	12	1	19	39965	244	0.78	~	
35S-01E	13	3	38	19905	184	0.67	~	
35S-02E	7	1	3	24203	229	0.95	~	2.2
35S-02E	7	3	2	27469	236	0.88	~	0.5
35S-02E	7	3	15	27469	236	0.88	~	0.5
35S-02E	7	5	5	21872	151	0.55	~	
35S-02E	9	3	10	49623	317	1.12	~	
35S-02E	9	7	4	49623	317	1.12	~	
35S-02E	17	3	13	30631	231	0.78	~	3.7
35S-02E	17	3	16	30631	231	0.78	~	3.7
35S-02E	17	4	12	49761	298	0.85	257	
35S-02E	17	9	8	34246	240	0.82	~	1.2
35S-02E	18	5	1	21872	151	0.55	~	
35S-02E	18	5	5	27469	236	0.88	~	
35S-02E	19	1	15	23459	213	0.72	~	4.1
35S-02E	19	4	17	35139	195	0.62	137	

Appendix K

Lower Big Butte Literature citations for timber and fuels write-ups (Mike Korn 6/11/01)

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Medford RMP

Lower Big Butte WA

FSEIS, 1994

Appendix K

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Shrub Group

Fire Behavior Fuel Model 4

Fire intensity and fast-spreading fires involve the foliage and live and dead fine woody material in the crowns of a nearly continuous secondary overstory. Stands of mature shrubs, 6 or more feet tall, such as California mixed chaparral, the high pocosin along the east coast, the pinebarrens of New Jersey, or the closed jack pine stands of the north-central States are typical candidates. Besides flammable foliage, dead woody material in the stands significantly contributes to the fire intensity. Height of stands qualifying for this model depends on local conditions. A deep litter layer may also hamper suppression efforts. Photographs 9, 10, 11, and 12 depict examples fitting this fuel model.

This fuel model represents 1978 NFDRS fuel models B and O; fire behavior estimates are more severe than obtained by models B or O.

Fuel model values for estimating fire behavior

Total fuel load, < 3-inch dead and live, tons/acre	13.0
Dead fuel load, ¼-inch, tons/acre	5.0
Live fuel load, foliage, tons/acre	5.0
Fuel bed depth, feet	6.0

Photo 9. Mixed chaparral of southern California; note dead fuel component in branchwood.

Photo 10. Chaparral composed of manzanita and chamise near the Inaja Fire Memorial, Calif.

Photo 11. Pocosin shrub field composed of species like fetterbush, gallberry, and the bays.

Photo 12. High shrub southern rough with quantity of dead limbwood.

Fire Behavior Fuel Model 5

Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and the grasses or forbs in the understory. The fires are generally not very intense because surface fuel loads are light, the shrubs are young with little dead material, and the foliage contains little volatile material. Usually shrubs are short and almost totally cover the area. Young, green stands with no dead wood would qualify: laurel, vine maple, alder, or even chaparral, manzanita, or chamise.

No 1978 NFDRS fuel model is represented, but model 5 can be considered as a second choice for NFDRS model D or as a third choice for NFDRS model T. Photographs 13 and 14 show field examples of this type. Young green stands may be up to 6 feet (2 m) high but have poor burning properties because of live vegetation.

Fuel model values for estimating fire behavior

Total fuel load, < 3-inch dead and live, tons/acre	3.5
Dead fuel load, ¼-inch, tons/acre	1.0
Live fuel load, foliage, tons/acre	2.0
Fuel bed depth, feet	2.0

Photo 13. Green, low shrub fields within timber stands or without overstory are typical. Example is Douglas-fir–snowberry habitat type.

Photo 14. Regeneration shrublands after fire or other disturbances have a large green fuel component, Sundance Fire, Pack River Area, Idaho.

Fire Behavior Fuel Model 6

Fires carry through the shrub layer where the foliage is more flammable than fuel model 5, but this requires moderate winds, greater than 8 mi/h (13 km/h) at mid-flame height. Fire will drop to the ground at low wind speeds or at openings in the stand. The shrubs are older, but not as tall as shrub types of model 4, nor do they contain as much fuel as model 4. A broad range of shrub conditions is covered by this model. Fuel situations to be considered include intermediate stands of chamise, chaparral, oak brush, low pocosin, Alaskan spruce taiga, and shrub tundra. Even hardwood slash that has cured can be considered. Pinyon-juniper shrublands may be represented but may overpredict rate of spread except at high winds, like 20 mi/h (32 km/h) at the 20-foot level.

The 1978 NFDRS fuel models F and Q are represented by this fuel model. It can be considered a second choice for models T and D and a third choice for model S. Photographs 15, 16, 17, and 18 show situations encompassed by this fuel model.

Fuel model values for estimating fire behavior

Total fuel load, < 3-inch dead and live, tons/acre	6.0
Dead fuel load, ¼-inch, tons/acre	1.5
Live fuel load, foliage, tons/acre	0
Fuel bed depth, feet	2.5

Photo 15. Pinyon-juniper with sagebrush near Ely, Nev.; understory mainly sage with some grass intermixed.

Photo 16. Southern hardwood shrub with pine slash residues.

Photo 17. Low pocosin shrub field in the south.

Photo 18. Frost-killed Gambel Oak foliage, less than 4 feet in height, in Colorado.

Timber Group

Fire Behavior Fuel Model 8

Slow-burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional "jackpot" or heavy fuel concentration that can flare up. Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards. Closed canopy stands of short-needle conifers or hardwoods that have leafed out support fire in the compact litter layer. This layer is mainly needles, leaves, and occasionally twigs because little undergrowth is present in the stand. Representative conifer types are white pine, and lodgepole pine, spruce, fir, and larch.

This model can be used for 1978 NFDRS fuel models H and R. Photographs 22, 23, and 24 illustrate the situations representative of this fuel.

Fuel model values for estimating fire behavior

Total fuel load, < 3-inch, dead and live, tons/acre	5.0
Dead fuel load, ¼-inch, tons/acre	1.5
Live fuel load, foliage, tons/acre	0
Fuel bed depth, feet	0.2

Photo 22. Surface litter fuels in western hemlock stands of Oregon and Washington.

Photo 23. Understory of inland Douglas-fir has little fuel here to add to dead-down litter load.

Photo 24. Closed stand of birch-aspen with leaf litter compacted.

Fire Behavior Fuel Model 10

The fires burn in the surface and ground fuels with greater fire intensity than the other timber litter models. Dead-down fuels include greater quantities of 3-inch (7.6-cm) or larger limbwood resulting from overmaturity or natural events that create a large load of dead material on the forest floor. Crowning out, spotting, and torching of individual trees are more frequent in this fuel situation, leading to potential fire control difficulties. Any forest type may be considered if heavy down material is present; examples are insect- or disease-ridden stands, windthrown stands, overmature situations with deadfall, and aged light thinning or partial-cut slash.

The 1978 NFDRS fuel model G is represented and is depicted in photographs 28, 29, and 30.

Fuel model values for estimating fire behavior

Total fuel load, < 3-inch dead and live, tons/acre	12.0
Dead fuel load, ¼-inch, tons/acre	3.0
Live fuel load, foliage, tons/acre	2.0
Fuel bed depth, feet	1.0

The fire intensities and spread rates of these timber litter fuel models are indicated by the following values when the dead fuel moisture content is 8 percent, live fuel moisture is 100 percent, and the effective windspeed at midflame height is 5 mi/h (8 km/h):

Model	Rate of spread *Chains/hour*	Flame length *Feet*
8	1.6	1.0
9	7.5	2.6
10	7.9	4.8

Fires such as above in model 10 are at the upper limit of control by direct attack. More wind or drier conditions could lead to an escaped fire.

Photo 28. Old-growth Douglas-fir with heavy ground fuels.

Photo 29. Mixed conifer stand with dead-down woody fuels.

Photo 30. Spruce habitat type where succession or natural disturbance can produce a heavy downed fuel load.