United States Department of the Interior

BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT OFFICE
3040 Riddle Road
Medford, Oregon 97504
email address: orll0mb@or.blm.gov

IN REPLY REFER TO:
1792(116)
Amend Ferris Bugman EA
A6820(WHY:jl)

JUL 25 2002

Dear Interested Public:

The enclosed ***Amended Environmental Assessment*** (EA) for the Ferris Bugman Project is being advertised in the Medford Mail Tribune for a 30-day public review period. The project purpose is to reduce the fire hazard on Bureau of Land Management (BLM) lands from high intensity wildfire, restore stand vigor/resiliency, and to provide a sustainable supply of timber and other forest products. The proposed action would commercial thin 1,856 acres of conifer stands, pre-commercial thin 360.8 acres of conifer stands, and non-commercial thin 1,537 acres of handwood and brush stands in the Middle Applegate Watershed west and north of Applegate, Oregon.

The primary purpose of this public review is to provide the you with an opportunity to comment on the BLM's determination that there *are* no significant impacts associated with the proposed action beyond those impacts addressed in the Medford District Record of Decision and Resource Management Plan.

This EA is published on the Medford District web site, www.or.blm.gov/Medford/, under "Planning Documents."

We welcome your comments on the content of the EA. We are particularly interested in comments that address one or more of the following: (1) new information that would affect the analysis, (2) information or evidence of flawed or incomplete analysis; and (3) additional alternatives to the Proposed Action that would respond to purpose and need. Specific comments arc the most useful. Comments, including names and addresses, will be available for public review. Individual respondents may request confidentiality. If you wish to withhold your name and/or address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

All comments should be made in writing and mailed *to* Ashland Resource Area Planning, 3040 Biddle Road, Medford, OR 97504. Any questions should be directed to Bill Yocum at (541) 618-2384.

Sincerely,

Richard J. Drehobl
Field Manager
Ashland Resource Area

Enclosure (as stated)

AMENDED ENVIRONMENTAL ASSESSMENT

for

FERRIS BUGMAN PROJECT

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

EA No. OR-110-01-009

This environmental assessment (EA) for the proposed Ferris Bugman Project was prepared utilizing a systematic interdisciplinary approach integrating the natural and social sciences and the environmental design arts with planning and decision making.

Public notice of the availability of this EA was provided through the BLM Medford District's central register and advertisement in the Medford Mail Tribune.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT

EA COVER SHEET

RESOURCE AREA: Ashland ACTION/TITLE: FERRIS BUGMAN

LOCATION: T.37S.,R.3W., Section 31, EA NUMBER: OR-110-01-009
T.38S.,R.3W., Sections 6, 7, & 18
T.37S.,R.4W., Sections 27, 29, 31-35
T.38S.,R 4W., Sections 1-15, 17-21, 29, 30, and 31, Willamette Meridian

List of Preparers	Title	Responsibility	Initials
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Additional input from: Karen Bolda (Riparian), Matt Broyles (Wildlife), Dan Dammann (Hydrology), Ted Hass (Soil), Paul Hosten (Shrublands, Fire), Jayne LeFors (Fish), Kenny McDaniels (Silviculture)).

ASHLAND RESOURCE AREA
Ferris Bugman ENVIRONMENTAL ASSESSMENT
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Note: A detached Appendices is contained in the EA File, and is available upon request from the Ashland Resource Area of the Medford District BLM.

CHAPTER I
INTRODUCTION

A. BACKGROUND

In 1997, the Ashland Resource Area of the Bureau of Land Management (BLM) began the process of planning restoration projects across a large portion of the Middle Applegate Watershed within the Applegate Valley. BLM evaluated land, vegetation, and stream conditions and developed a plan that included thinning forests including oak woodlands and brushlands, reintroducing prescribed fire, and reducing sediment impacts to streams. This large landscape plan encompassed 43,380 acres of land, 24,000 acres of which are publically owned, and was called the "Appleseed Project." In May 1999, the Appleseed Environmental Assessment (EA) was released for public review. Many Applegate residents and others took the time to write lengthy critiques of the project and the EA. A common theme was that the scope of the project was too large, making it difficult for local residents to understand what was occurring on public land.

In order to better explain the proposed project actions, this EA analyzes a portion of the larger Appleseed project. It describes and assesses the proposed actions in the Ferris Gulch, Slagle Creek, and Humbug Creek drainages. The Ferris Bugman Project area covers approximately 19,511 acres in the Middle Applegate Watershed, of which 10,085 acres are publically owned land. This EA includes a cumulative effects analysis of these actions as well as past, present and reasonably foreseeable actions in the Applegate Valley.

November 8, 2001 the Ferris Bugman EA was made available for a 30 day public comment period to provide the public with an opportunity to comment on the BLM's determination that there are no significant impacts associated with the proposed action and, therefore, an environmental impact statement is not necessary. A comment analysis was performed and the outcome displayed new information that was not analyzed in the EA. The Ashland Field Manager then directed the Interdisciplinary Team to incorporate this new information into this amended EA.

The term Area of Critical Environmental Concern or ACEC refers to public lands, administered by the Bureau of Land Management, where it has been determined that special management attention is needed to protect and prevent irreparable damage to important historic, cultural, scenic values, fish, or wildlife resources or their natural systems or processes; or to protect human life and safety from natural hazards. The process for the establishment of an ACEC is through the preparation and/or amendment of a resource management plan (RMP). The Medford District published a Record of Decision for the current RMP in 1995 (USDI 1995a). That plan evaluated numerous lands proposed for ACEC designation. Currently, the Medford District does not anticipate initiating any RMP planning efforts in the near future. However, our ACEC policy allows for public identification and submission of new information or evidence about the relevance and importance of resources or hazards on BLM administered lands that might meet the ACEC criteria. If, through a preliminary evaluation of the submitted information, we find that the information meets the identification criteria, we will either consider a land use planning amendment to further evaluate the potential ACEC or provide temporary management to protect the subject values.

BLM received a nominations for: 1) a potential ACEC and/or a Wilderness Study Area (WSA) on 5,800 acres in the Middle Applegate watershed and 2) as a potential ACEC on 11,200 acres in the Middle Applegate. These nominations were received during a time when a Medford District Resource Management Planning effort is not underway. BLM's response to these nominations are contained in the appendix S of this EA

This document complies with the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA; 40 CFR Parts 1500-1508) and the Department of the Interior's manual guidance on the National Environmental Policy Act of 1969 (516 DM 1-7). The EA file is available for review by scheduling an appointment through the Ashland Planning Department at

(541)618-2384.

B. PURPOSE AND NEED

An interdisciplinary team (ID Team) of resource specialists was formed to design projects that:

- Reduce the risk of high intensity wildfire and tree mortality by restoring the vigor, resiliency, and stability of forest stands.
- Manage developing forest stands to promote desired tree species, tree survival, tree growth; achieve a balance between wood volume production, quality of wood, and timber value at harvest.
- Provide a sustainable supply of timber and other forest products.

The Ashland Field Manager also directed the ID Team to: 1) comply with the Record of Decision (ROD) for the Medford District Resource Management Plan; and 2) design projects that minimize the financial burden to taxpayers by utilizing the value of existing resources.

Three alternatives were developed for this project. A description of these alternatives can be found in Chapter II of this document.

C. CONFORMANCE WITH EXISTING LAND USE PLANS

The proposed activities are in conformance with and tiered to the *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (SEIS)(USDI, USDA 2001) and the Medford District Final Environmental Impact Statement (October 1994) and the Resource Management Plan (RMP)(USDI 1995a). These Resource Management Plans incorporate the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (NWFP) (USDA and USDI 1994). These documents are available at the Medford BLM office. These documents are available at the Medford BLM office and on the Medford BLM web site at <http://www.or.blm.gov/Medford/>.

D. 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), Federal Land Policy and Management Act of 1976 (FLPMA), the Endangered Species Act (ESA), and the Clean Water Act.

E. DECISIONS TO BE MADE ON THIS ANALYSIS

This EA is being prepared to determine if the proposed action and any of the alternatives would have a significant effect on the human environment beyond those analyzed in other tiered documents as listed above. It is also being used to inform the Ashland Resource Area Field Manager (decision maker), individuals, and organizations interested parties of the anticipated impacts. It also provides individuals and organization with an opportunity to comment on the merits of the alternatives.

The Ashland Resource Area Field Manager must decide:

- Whether or not the impacts of the proposed action are significant to the human environment beyond those analyzed in other tiered documents as listed above. If the impacts are determined to be insignificant, a Finding of No Significant Impact (FONSI) can be issued and a decision implemented. If any impacts are determined to be significant to the human environment, then an EIS must be prepared before the Manager makes a decision.
- Whether to implement any of the action alternatives or defer to the no action alternative.

F. ISSUES OF CONCERN

There was an open process for identifying and addressing issues related to the action alternatives of this project during scoping for the Quartz Fire Project. Invitation for participation of Federal, State, Local agencies, and

interested parties was accomplished by letters, phone calls, field tours, public meetings, and individual meetings. Issues and concerns were taken into consideration throughout the development of this project.

The following issues were identified and reviewed by the ID Team. Not every issue is analyzed in detail by this EA.

1. Dense Stands/Forest Health - Many of the stands in the area, both conifer and hardwood, are overly dense. Dense stands are not vigorous (i.e., slow growth rates, too much competition for water and nutrients, susceptible to insects and drought) and constitute a fire hazard.
2. Landscape Fire Hazard - With effective fire suppression of low intensity fire, the amount of vegetation (fuel loading) and consequent fire hazard continues to increase.
3. Threatened & Endangered and Special Status Plant Species - Special status species are known to be in this area including *Cypripedium* orchids and *Fritillaria gentneri* (Gentner's fritillary), a federally listed endangered species.
4. Threatened & Endangered and Special Status Animal Species - Special status species are known to be in this area including the Siskiyou mountains salamander, some bat species, and the northern spotted owl, a federally listed threatened species.
5. Fisheries - The proposed action could impact water quality and/or anadromous fish.
6. Soils - The proposed action could impact soil, increase erosion, and affect the water resources.
7. Impacts to Residents - Harvesting would have a short-term impact on local residents by increasing noise from helicopter operations and increasing traffic on existing roads.
8. Access - Roads are needed for long-term management. However, roads intensify interactions with hunters, local residents, and off-highway vehicles. Roads also could impact the water resources, and potentially increase the abundance of noxious weeds in the watershed.
9. Invasive, Nonnative Species - Activity and disturbance in an area increases the spread of non-native species, such as star thistle, in open environments of the project area.
10. Cumulative Effects - These are the overall effects of this project, along with other federal and non-federal projects, on the Middle Applegate Watershed and its resources.
11. Wildlife - Overall reduction of snags and forest stand canopy closures over large landscapes would reduce habitat for some wildlife species. Logging operations would result in localized, short-term noise disturbances affecting wildlife (e.g., big game and nesting birds).

CHAPTER II
ALTERNATIVES

A. INTRODUCTION

This chapter describes the proposed action and an alternative to the proposed action. In addition, a "No Action" alternative is presented to form a base line for analysis. This chapter also outlines project mitigation which is designed into the alternatives. The mitigation or Project Design Features (PDFs) are included for the purpose of reducing or eliminating anticipated adverse environmental impacts. Analysis supporting the inclusion of PDFs can be found in the appendices of this EA and Appendix D and E of the RMP (USDI 1995a).

The proposed action is designed to meet the purpose and need of the RMP (USDI 1995a), the project objectives outlined in pages 83-95 of the Middle Applegate Watershed Analysis (USDI 1995b) and incorporates the best management practices outlined in the RMP (USDI 1995a, pages 149-177).

The PDFs followed by an asterisk (*) are Best Management Practices (BMPs) to reduce nonpoint source pollution to the maximum extent practicable. BMPs are considered the primary mechanisms to achieve Oregon Water Quality standards. Implementation of PDFs in addition to establishment of Riparian Reserves would equal or exceed Oregon State Forest Practice Rules. BMP effectiveness monitoring would be conducted and where necessary, BMPs modified to ensure compliance with Oregon Water Quality Standards.

B. ALTERNATIVE 1: NO ACTION

Under the "no action" alternative, no vegetation management projects would be implemented; there would be no mechanical thinning, hand thinning, or prescribed burning projects. No roads would be constructed, improved or decommissioned (transportation management).

C. ALTERNATIVE 2: PROPOSED ACTION--VARIABLE VEGETATION PRESCRIPTION WITH TRANSPORTATION MANAGEMENT

Alternative 2 proposes to:

- thin commercial conifer stands (1,856 acres) that are in need of forest health restoration;
- thin precommercial conifer (311 acres);
- thin noncommercial woodland and shrub stands (1,537 acres) to reduce existing, continuous, and heavy fuels in an identified high wildfire risk and hazard area;
- implement transportation management objectives: construct new roads, amend the M-2000 Right-of-Way and Road Use Agreement with Indian Hills, amend the M-660 Right-of-Way and Road Use Agreement with Boise Corporation, improve many existing roads, close some roads to public access, and decommission some roads which are no longer needed;
- treat noxious weeds.

Commercial thinning (of trees) would be accomplished with a combination of helicopter, cable-yarding and tractor-yarding techniques. Thinning precommercial and noncommercial stands would be accomplished by using mechanical techniques of cutting and chipping (e.g. "Slashbuster"), hand crews with chain saws, and/or prescribed fire. Noxious weeds would be treated with a combination of bio-control, weeding by hand, and using fire to burn plants before seed release. Details on these activities are found throughout this document and in the Appendices.

The following PDFs apply to this Proposed Action Alternative:

1. Roads and Helicopter Landings

All new and decommissioned roads would be closed to Off-Highway Vehicle (OHV) use except for administrative and emergency use. OHV road closures that protect resources are consistent with the existing OHV strategy and

43 CFR Part 8340.

The availability of roads has a direct impact on the types of yarding systems used.

Road Construction
When new roads pass through areas that are visible from major roads and other important sites, efforts would be made to minimize the visual impact by; keeping the road narrow, end-hauling any excess material, and reserving additional trees below the road that would screen the view of the road.

Slash from road construction would be windrowed at the base of the fill slope to catch sediment during the first wet season*. Where feasible, the road surface would be outsloped, with rolling water dips; these design features would be used to reduce concentration of flows and minimize accumulation of water from road drainage.* The fill slopes and fill shoulders on all new roads would be seeded with native or approved seed mix, fertilized and mulched*. New roads would be gated or blocked during all seasons to passenger vehicles except for authorized use*. To reduce the potential for erosion, new permanent roads would be surfaced with rock*.

Road construction would not usually occur during the winter months when the potential for soil erosion and degradation of water quality may take place.* This also helps to prevent fill settlement and cracking. Road construction would normally occur during dry conditions (usually May 15 to October 15) in order to reduce the potential for soil erosion and degradation of water quality.* All construction activities would be stopped during a rain event of 0.2 inches or more within a 24-hour period.* If on-site information is inadequate, measurements from the nearest Remote Automated Weather Station (Provolt or Star Ranger Station) would be used. Construction activities would not occur for at least 48 hours after rainfall has stopped or on approval by the Contract Administrator.* A seasonal restriction of October 15 to May 15 would be placed in the contract which could be waived under dry conditions and a specific erosion control plan (eg. rocking, waterbarring, seeding, mulching, barricading).*

Bare soil due to road construction/renovation would be protected and stabilized prior to fall rains.*

Short temporary roads, referred to as operator spurs, may be needed to facilitate logging. These operator spurs would be proposed by the contractor and approved, if appropriate, by BLM. The length of operator spurs normally varies between 100 feet and 500 feet. They would be natural surfaced roads that would be constructed, used, and decommissioned or obliterated where appropriate during the dry season of the year (usually May 15 to October 15).* The roads would be waterbarred and barricaded if use is not competed by October 15.*

Road Decommissioning. Some existing roads would be decommissioned as listed in Appendix A.
Road decommissioning would normally occur the final dry season (usually May 15 to October 15) of the contract in order to reduce the amount of soil disturbance occurring in one season as a result of road work.*

Stream crossings would be reestablished to the natural stream gradient and valley form.* This would be accomplished by removing the culvert and the road fill within the stream crossing areas. Stream side slopes would be reestablished to natural contours.* Excavated material would be removed from stream crossing areas and placed at stable locations.*

Ground-disturbed areas on all decommissioned roads would be seeded with native or approved seed, and mulched.*

Types of decommissioning are as follows:
- Natural Decommission - Some roads are presently well drained and have vegetation growing on them. They may also have trees and brush encroaching from the sides and trees that have fallen across them. Sections of these roads would be allowed to decommission naturally but may include some selective ripping, removal of

drainage structures, construction of water bars and barricades.*
- Mechanical Decommission - Roads would be decommissioned mechanically. This usually includes ripping, removing drainage structures, seeding and/or planting, mulching, constructing water bars and barricades.*

Helicopter landings
The construction of helicopter landings would normally occur during the dry season (May 15 to Oct. 15)*. No construction of new landings or expansion of old landings would be allowed in Riparian Reserves*.

Helicopter landings on BLM administered land would be treated to reduce soil erosion*. Treatment of the running surface would be dependent on site conditions and would include one of the following:
- Subsoil/till or rip, then mulch and seed with native grasses or other approved seed*.
- Surface with durable rock material*.
- No treatment would be necessary where adequate quality and quantity of natural rock exists.

Fill slopes of helicopter landings would be seeded with native grasses or other approved seed mixes and mulched, except where rock occurs*.

Hauling Restrictions. A seasonal hauling restriction would be required on natural surfaced (dirt) roads during the wet season (usually October 15 to May 15).* This would protect the road from damage and decrease the amount of sedimentation that would occur. Some variations in these dates would be permitted dependent upon weather and soil moisture conditions of the roads. Refer to Appendix A for all hauling seasonal restrictions.

Rock Surfacing and Quarries. Rock would be used to stabilize and minimize erosion on selected roads and landings.* Rock would be obtained from one or more of the following existing quarries which are located in SW1/4 Section 8, T38S, R3W; SW1/4 Section 27, T37S, R4W; and NW1/4 Section 31, T38S, R4W.

Dust Abatement. Dust abatement would provide driver safety and protect the road surface by stabilizing and binding the aggregate road surface*. Water, lignin, magnesium chloride, road oil, or Bituminous Surface Treatment (BST) would be used.

Road Maintenance. Roads would be maintained on a long-term basis.* Minor improvements and design changes may be needed to stabilize and correct conditions that are causing erosion or unsafe situations.*

Road Use Agreements. Existing road agreements for access are between private companies and BLM. Road use agreements M-660, M-2000, and M-800 would be used for access to BLM administered land.

Culvert Installation/Replacement
Instream work period would be from July 1 - September 15 on actively flowing streams.*

At all stream crossings the approach would be as near a right angle to the stream as possible to minimize disturbance to streambanks and riparian habitat.*

Stream crossing culverts that are replaced would be sized to accommodate 100-year flood events.*

Projects would be designed to ensure upstream movement of aquatic species.*

Culvert frequency would be increased over standard spacing and “splash pad” energy dissipaters would be placed at the outlet of culverts on the section of new road construction coming down into the meadow in NW1/4 Section 35, T37S, R4W, to prevent channelization of flow below the road in the meadow area.*

Fill material over stream crossing structures would be stabilized as soon as possible after construction has been completed, normally before October 15. Exposed soils would be seeded and mulched. Work would be temporarily suspended if rain saturates soils to the extent that there is potential for environmental damage, including movement of sediment from the road to the stream.*

Location of waste stockpile and borrow sites would not be located within Riparian Reserves.*

The contractor would be notified that he is responsible for meeting all state and federal requirements for maintaining water quality. Standard contract stipulations would include the following:

- Heavy equipment would be inspected and cleaned before moving onto the project site in order to remove oil and grease, invasive, non-native species (for example, noxious weeds) and excessive soil.*
- Hydraulic fluid and fuel lines on heavy mechanized equipment must be in proper working condition in order to prevent leakage into streams.*
- Waste diesel, oil, hydraulic fluid and other hazardous materials and contaminated soil near the stream would be removed from the site and disposed of in accordance with Department of Environmental Quality (DEQ) regulations.* Areas that have been saturated with toxic materials would be excavated to a depth of 12 inches beyond the contaminated material or as required by DEQ.*
- Equipment refueling would be conducted within a confined area outside Riparian Reserves.*
- Use spill containment booms or other equipment as required by DEQ.*
- At no time would mechanical equipment be stored in the Riparian Reserves.*

2. Range

The Billy Mountain Allotment #20203 is located within the project area. Existing fences would need to be protected from logging activity by felling away from fences. Care would be taken to protect rangeland improvements in the fire hazard reduction units.

3. Harvest and Logging Systems

In order to minimize loss of soil productivity, soil damage, compaction and displacement, the project would employ all pertinent Best Management Practices relative to soils as detailed under Fragile Soils, Roads and Landings, Timber Harvest and Silviculture in the Medford District's ROD and RMP (USDI 1995a), and also the SEIS ROD.

All ground based logging, cable logging and loading equipment would be cleaned prior to operation on government land to prevent the spread of noxious weeds. Only logging systems which meet all of the project design features would be used in these projects.*

All landing locations would be approved by BLM. Landing size would be kept to a minimum. Normally, this would be less than ¼ acre for tractor and cable units, and less than one (1.0) acre for helicopter units. No helicopter landing construction would occur within ¼ mile of known mine adits. No new landings would be constructed in Riparian Reserves.* Any existing landings within Riparian Reserves would not be expanded and would be evaluated carefully before use.*

When operationally feasible, all units would be yarded in such a way that the coarse woody debris remaining after logging would be maintained at or greater than current levels in order to protect the surface soil and maintain productivity.*

Wherever trees are cut to be removed, directional felling away from Riparian Reserves, dry draws and irrigation ditches would be practiced.* Maximum operational suspension would be practiced to alleviate gouging and other disturbance on draw side slopes and headwalls.* Skyline and tractor yarding would be avoided in draw bottoms*. The intent is to minimize occurrence of erosion in existing areas of concentrated surface flow.

Trees would be felled to the lead in relation to the skid trails. The intent of falling to the lead is to minimize the yarding damage to leave trees and regeneration under conventional yarding systems.

For all cable yarding, maximum operational suspension would be maintained on slopes greater than 50 percent. Minimum corridor widths *(*generally less than 15 feet in width) would be utilized to assure silvicultural prescriptions and objectives are met. No yarding corridors would be located in Riparian Reserves.* Trees would be felled towards the yarding corridors. Disturbed ground from cable yarding corridors would be water barred where needed.

Tractor yarding would normally occur between May 15 to October 15 or on approval by the Contract Administrator. Some variations in these dates would be permitted dependent upon weather and soil moisture conditions. The intent is to minimize off-site erosion and sedimentation to local waterways.

For all tractor yarding, skid trail locations would be approved by BLM. Skid trail locations would avoid ground with slopes over 35 percent and any areas with high water tables.* Maximum unit area in skid trails would be less than 12 percent.* Existing skid trails would be utilized when possible.* Tractors would be equipped with integral arches to obtain one end log suspension during skidding of logs.* Every effort would be made to maintain canopy cover over skid trails.* The intent is to minimize areas affected by tractors and other mechanical equipment (disturbance, particle displacement, deflection, and compaction) and thus minimize soil productivity loss. The intent is also to minimize off-site erosion and sedimentation to local waterways.*

All skid trails would be water barred utilizing the spacing and construction techniques outlined on page 167 of the Medford District RMP (USDI 1995a).* Main tractor skid trails would be blocked with an earth and log barricade where they intersect haul roads.* The intent is to minimize erosion and routing of overland flow to streams by decreasing disturbance.

Noise disturbance to local residents would be partially mitigated by regulating operating hours, days, and seasons through portions of the project area. Generally, any helicopter logging closer than ½ mile of a residence would be restricted to an operating period of 8:00 a.m. to 5:00 p.m., Monday through Friday. Any helicopter logging located ½ to one (1.0) mile from a residence would be restricted to an operating period of 6:00 a.m. to 6:00 p.m., Monday through Saturday; and no operating time restriction would be enforced when helicopter operations are greater than 1.0 (one) mile from a residence.

To maintain the stability of colluvial layers in draw bottoms, large trees would not be cut in bottoms of (non-Riparian Reserve) dry draws.* Smaller trees and vegetation would be thinned to reduce understory fuel load in these areas, to prevent loss of the larger trees in fire events.*

Pipeline rights-of-way in the project area would be protected from damage. An attempt would be made to protect any known pipelines outside of existing rights-of-way (see Appendix H), but protection cannot be assured if the pipeline owner has no legal right-of-way.

4. Fuels Treatment

In pine series forests where the single tree and group selection methods are used, logging slash should be handpiled outside of the driplines of individual pine trees and burned (swamper burning). This site preparation treatment should also be used in the areas where hardwoods may have been harvested so that early seral species can be planted. Prescribed, fall or spring under burning is an option in the pine series forest stands in order to reduce slash and fuel loading while preparing suitable seedbeds for reproduction. All prescribed burns should be performed when moisture conditions are high enough and prescription windows are at a level so that no more than 50% of the mound depth/duff layer around pine trees is consumed during burning. In addition no more than 25% of the pine tree live crown should be scorched for trees 8 inches DBH and larger. Cool burns are needed so that

residual tree roots and foliage are not killed, stressed or damaged in a manner which predisposes pine to bark beetle infestation.

In moist and dry Douglas-fir units where only commercial thinning is performed, logging slash should be lopped and scattered if the tree tops are removed. If tops are not removed the slash should be handpiled and burned. Prescribed burning would benefit some Douglas-fir timber stands that have dense mats of grass or shrub species.

After timber harvest, non-merchantable trees with undesirable silvicultural characteristics (e.g. broken top, scared stem) should be slashed. In areas where precommercial thinning is prescribed, all non-merchantable trees should be cut except the largest live conifer trees that meet the following criteria:

- Minimum 4-inch terminal leader with at least the top 40 % of the tree containing live limbs.
- Non-chlorotic, light or dark green with very little or no yellowish tint.
- Undamaged top.
- Free of visible disease, cankers, fire damage, or blister rust.
- Demonstrates good form and vigor.
- No multiple tops or ramiforms.

In the absence of conifers that meet the above definition for an acceptable crop tree, include any live conifer seedling that is at least three (3) feet tall that falls within the spacing guidelines.

In the absence of conifer trees, hardwoods would be considered acceptable trees. The order of preference will be bigleaf maple, Oregon ash, willow species, any oak species, and Pacific madrone. Space the acceptable conifer and hardwood trees at a variable spacing (12 to 18 feet).

In all prescription areas, 1/7-acre in size and larger, where overstory trees were marked to release healthy, Douglas-fir seedlings through saplings, the natural regeneration would be precommercially thinned. Seedlings (0-2 inches DBH) should be thinned to a 12 x 12-foot spacing; saplings (2.1 to 4 inches DBH) to an 17 x 17-foot spacing; and poles (4.1 to 7 inches DBH to a 21 x 21-foot spacing.

Throughout the entire project area, all saplings through pole (7 inch DBH and smaller trees) timber should be slashed within the dripline of the old-growth trees that were released with the 15 to 25-foot crown space.

Portion of Units N1, N4, N8 and N9 are in Soil Category 1, all other units are in Soil Category 2. (Soil Category is a system of classification used by fuel managers to rate sensitivity of soil to burning. Class 1 is highly sensitive). Consequently, burning would only occur in spring-like conditions when the soil and duff are moist. Assure retention of minimum levels of coarse woody debris and recruitment snags as specified in the Standards and Guidelines on page C-40 in the SEIS ROD. All fuel management activities which would occur within the project area would meet Aquatic Conservation Strategy and Riparian Reserve objectives.

Ensure that fingers of unburned material are scattered over the units. If necessary, these refugia would allow for the reintroduction of soil organisms into adjacent areas that may have burned too hot. The pattern of unburned islands of duff is important. These fingers of unburned material would be oriented parallel to topographic features such as creeks, draws and ridges.

Due to the impacts to soil organisms, hand piling and burning piled slash would be considered as a treatment alternative only where current fuel loading is too high to consider under-burning (i.e., low-to-moderate intensity burning could not be achieved), or where under-burning would not be economically or operationally feasible. This may be due to the unit being adjacent to private property or to the lack of control areas such as roads, streams or wet areas, natural topographic breaks or barriers.

Any areas planned for fuels treatment may be reexamined by resource specialists at any stage of treatment to determine if the planned fuels treatment is still applicable. At the discretion of resource specialists, planned treatments may be changed to better meet the objectives outlined in this EA. Proposed changes will be limited to treatments allowed under this EA or amendments to this EA.

Future maintenance of all treated areas would maintain low fuel loadings and fire-dependent species. Underburning (conifer stands) and broadcast burning (woodlands and grasslands) would be the preferred methods for maintaining these areas.

Prescribed burning operations would follow requirements of the Oregon Smoke Management Plan and the Department of Environmental Quality Air Quality and Visibility Protection Program. Prescribed burning includes underburning, broadcast, and handpile burning.

Measures to reduce the potential level of smoke emissions from proposed burn sites would include completing mop up as soon as practical after the fire, facilitating quick and complete combustion of smaller fuels by burning them with lower fuel moisture, minimizing consumption and burn out time of larger fuels by burning them at higher fuel moisture, and covering hand piles so that burning is possible during the rainy season when there is a stronger possibility of atmospheric mixing and/or scrubbing of smoke.

The treatment of fuels is proposed throughout the entire landscape of the project area. Strategic areas such as major ridge lines are targeted for treatment in order to fragment continuous fuels found throughout the project area. The use of prescribed fire and thinning would reinforce these natural features which would aid in the suppression of wildfires. Four major ridge lines are proposed for treatment. The treatment of the proposed units in Ferris Gulch would reinforce the west flank of an existing shaded fuel break which is located on the ridge line that separates Thompson Creek and Ferris Gulch. The ridge line that separates Ferris Gulch from the Williams Valley would also be treated. The ridge line which runs from Blue Mountain to Billy Mountain and separates Slagle Creek from Humbug Creek is also proposed for treatment. The other major ridge line proposed for treatment is the ridge line that separates Humbug Creek from Long Gulch.

The commercial thinning of timber stands under this project would reduce the aerial component of fuels that is currently present. The fuels reduction work proposed for all of these stands would reduce the ladder and surface fuels. This type of work is proposed in order to reduce the current fuel hazard which exist and to mitigate the increased fuel loadings created by thinning operations.

Fuels have accumulated within these stands, due to the absence of fire, which precludes single entry fuels treatment in most areas. The energy release from prescribed fire as the initial entry would exceed desired intensity levels and have undesirable effects on vegetation and soil. A combination of mechanical or manual treatments with prescribed fire is necessary to ensure all resource objectives are met.

An array of fuel treatments can be utilized in these stands to modify vegetative patterns and reduce high fuel levels. Factors such as existing and projected fuel loadings, existing vegetative conditions, slope, and access have to be taken into consideration for prescribing the type of fuels management treatment that should be implemented. These treatments include mechanical methods, manual treatments, prescribed burning, or a combination of these treatments.

To minimize loss in soil productivity and surface erosion, the average unit slope for mechanical operations would be less than 35%.* The maximum slope for the slashbuster would be 45%, but only on short pitches less than 300 feet. Any mechanical operations on fragile soils (as shown on the BLM GIS Soils mapping or identified by the Soil Scientist) would be limited to slopes of 25% or less.*

Manual treatment of fuels consist of hand cutting of existing ladder fuels and then hand piling this material so it

can be burned. This type of treatment would be utilized in the majority of stands. The manual treatment of fuels normally is completed in commercially thinned units within one year of when a unit has been harvested.

Prescribed burning in these timber stands includes underburning and handpile burning. Handpile burning would be used as the initial entry for burning in the majority of stands. High fuel loadings in these areas make underburning not possible due to the high probability of mortality to the residual stand. This type of burning takes place in the late fall and winter. Handpile burning takes place in the late fall and winter and is done after fuels have cured for one summer. Underburning is the preferred method of fuels reduction work in stands of conifers and hardwoods. Underburning is a low intensity surface fire which can be highly effective in reducing a large amount of surface fuels and some ladder fuels. This type of burning would be used in some stands as the initial entry but in most stands it would be the follow up treatment after handpile burning. Underburning occurs in late fall and spring. This type of burning is done after fuels have cured for one season.

As previously discussed, fire is recognized as playing an important role in the development and maintenance of vegetative diversity in fire prone ecosystems as found throughout the project area. Prescribed fire is a tool which would be used to meet objectives for vegetative communities such as grasslands, shrublands and oak woodlands. In the grasslands prescribed fire would be used for the improvement of native grass/annual grass mix to a more native grass domination and assist in the restoration of annual grass monoculture to a native grass domination. In the shrublands, prescribed fire would help recreate a range of wedgeleaf ceanothus stand ages across the landscape. The use of prescribed fire in the Woodlands would help restore tree composition due to the invasion of conifers. The balance of herbaceous plants, shrubs and trees could also be restored in the woodlands. Fire would also assist in the thinning of white oak stands to historic tree densities.

High fuel loadings, due to the absence of fire, preclude single entry fuels treatment in some of shrublands and oak woodlands. Mechanical and manual treatment of fuels described previously are proposed for the initial treatment so that prescribed fire can then be used to meet resource objectives.

Broadcast burning and underburning is proposed as the initial treatment for some grasslands and shrublands to restore native vegetation and modify seral stages in vegetative communities. This type of burning would occur in the late summer, fall or early winter.

Future maintenance of all areas treated in the project area would be needed in order to maintain low fuel loadings and species dependent on fire. Underburning and broadcast burning are the preferred methods for maintaining these areas.

5. Mechanical chipping and thinning on precommercial conifer stands and noncommercial woodland and shrub stands.

In order to provide for escape, hiding, thermal, and nesting cover for a variety of species, 15-20% of the proposed area will be left in an untreated condition within the noncommercial woodland and shrub stands. These deferral reserves would be at least three acres in size and covering a variety of vegetative conditions.

To minimize loss in soil productivity and surface erosion, the average unit slope for mechanical operations would be less than 35%.* The maximum slope for the slashbuster would be 45%, but only on short pitches less than 300 feet. Any mechanical operations on fragile soils (as shown on the BLM GIS Soils mapping or identified by the Soil Scientist) would be limited to slopes of 25% or less.*

Old skidroads would not be opened or driven on without the approval of the authorized officer.* Cut material or slashbuster material would be placed on the running surface of old skid roads or jeep roads that are authorized to be used or are encountered during operations, to provide a cover/mulch layer over exposed soil.* Old skidroads would not be treated near the intersections with system roads in order to provide a visual screen and discourage

vehicular access.*

6. Special Status Plant Species, Species to be Protected Through Survey and Manage Guidelines, and Protection Buffer Species

Special Status Plant and Animal Species are species that are Federally listed, proposed, or candidates for listing by the U.S. Fish and Wildlife Service, including species the BLM considers Special Status Species (i.e. sensitive species, assessment species, tracking and watch species). A list of the Special Status Plant List and their BLM status is included in the Appendix.

Bureau Sensitive species and their habitats would be managed, protected and conserved so that the proposed action would not contribute to the need to list these species.

The following actions would be taken to protect special status species in the project area:

- *Fritillaria gentneri:* There is one occurrence within the proposed harvest unit Bugman #15, T38S, R4W, SEC 13, and one occurrence on the edge of the proposed burn unit in T38S, R3W, SEC 7, NW1/4. Both sites would receive a 150 feet radius buffer.
- *Arabis modesta:* The one known occurrence within the proposed harvest unit Slagle #16, T38S, R4W, SEC 5, would receive a 100 to 150 feet variable radius buffer.
- *Clarkia heterandera*: This species occurs in shady sites in foothill woodland, yellow pine forest, and chaparral communities ranging in elevation from 1500-5100 ft. There is one known occurrence within the proposed harvest unit Ferris Gulch #16 , T38S, R4W, SEC 18. Selective removal of overstory trees to a minimum of 40% canopy closure would be allowed within the population boundaries of the *Clarkia heterandera* population in question. Logging systems would be laid out under the guidance of a botanist to minimize disturbance to individual plants. Trees that can be felled away from individual *Clarkia heterandera* plants and removed via conventional skidding, without damage to such plants, would be removed by this method. Any trees that cannot be removed without meeting these two criteria will be removed by helicopter.
- *Cypripedium fasciculatum:* Known sites exist within the following units: Bugman #6, T38S, 4W, SEC 1 (3 sites), Bugman #8, T38S, 4W, SEC 12 (3 sites), Bugman #10, T38S, R3W, SEC's 7 &12 (5 sites), Bugman #11, T38S, R3W, SEC 7 (3 sites) Bugman #13 & #14, T38S, R4W, SEC 13, T38S, R3W, 18 (11sites), Bugman #15, T38S, R4W, SEC 13 (2 sites), Ferris Gulch # 4, T38S, R4W, SEC 29 (1 site), Slagle #3, T37S, R4W, SEC 33 (1site), Slagle #8, T38S, R4W, SEC 33 (2 sites), and Slagle #19, T38S, R4W, SEC 4 (2 sites). In addition there are three sites in or on the edge of the proposed burn units in T38S, R4W, SEC 9 and one site in the proposed burn unit in T38S, R4W, SEC 1. These sites would receive a 100 to 150 feet variable radius buffer.
- *Festuca elmeri:* The three known occurrences within the proposed harvest unit Slagle #8, T38S, R4W, SEC 9 and T38S, R4W, SEC 3 , and the five known occurrences in the proposed burn unit in T38S, R4W, SEC 9 would receive a 100 to 150 feet variable radius buffer.
- *Meconella oregana:* The one known occurrence within the proposed harvest unit Slagle #16 , T38S, R4W, SEC 5, would receive a 100 to 150 feet variable radius buffer.
- *Mimulus bolanderi:* The two known occurrences in the proposed burn unit in T38S, R4W, SEC 9 would receive a 100 to 150 feet radius buffer.
- *Sedum oblanceolatum:* There is one known occurrence within each of following proposed harvest units,Bugman #1, T37S, R3W, SEC 31, Bugman #5, T38S, R3W, SEC 6, Bugman #7, T38S, R4W, SEC 1, and Slagle #8, T38S, 4W, SEC 9, one known occurrence within the proposed burn unit in T38S, R4W, SEC 12, and two occurrences in the proposed burn unit in T38S, R3W, SEC 7. These sites would receive a 100 to 150 feet variable radius buffer.
- *Bryoria tortuosa:* The 13 occurrences in the following proposed harvest units; Bugman #12, T38S,R3W, SEC 7 (1site), Bugman #6, T38S, R4W, SEC 1 (1 site), Ferris Gulch #10, T38S, 4W, SEC 19 (1 site) Ferris Gulch #13, T38S, R4W, SEC 19 (5 sites), Ferris Gulch #17, T38S, 4W, SEC 20 (1 site), Ferris

Gulch #8, T38S, R4W, SEC 30 (2 sites), Slagle #3, T37S, 4W, SEC 33 (1 site), and Slagle #12, T38S, R4W, SEC 33 (1 site) and the one occurrence in the proposed burn unit in T38S, 4W, SEC 7, NE1/4 would receive a 100 feet radius buffer.

- *Dendriscocaulon intricatulum:* The three occurrences in the following proposed proposed harvest units; Bugman #6, T38S, R4W, SEC 1 (1 site) and Bugman #12, T38S, R3W, SEC 7 (2 sites), would receive 100 feet radius buffers.

7. Wildlife

Threatened/Endangered Wildlife. *Northern spotted owls:* Reserve from harvest the designated 100-acre core areas for 4 northern spotted owl sites which were designated as known sites on 1/1/94. Place a seasonal restriction on harvest activities within 0.25 miles of the center of activity for the owl sites. This restriction would be in effect from March 1 through June 15 for disturbance activities, such as hauling, and from March 1 through September 30 for removal of habitat within the restricted area. This restriction could be lifted on an annual basis if protocol surveys by the BLM indicate that the site is not reproductive in a given year.

Any new pairs of spotted owls found before or during the sale contract period adopt the same seasonal restriction as outlined above.

Special Status Species and Species to be Protected Through Survey and Manage Guidelines. In the project area surveys for great gray owls, red tree voles, and mollusks have been completed to the standards outlined in the NWFP, Survey and Manage guidelines as amended in Jan. 2001. Surveys found no red tree vole nests or survey and manage mollusk species in the project area. If any species are found prior to implementation, they would be protected as outlined in the NWFP.

Siskiyou mountains salamander: Protect two known Siskiyou mountains salamander sites in Ferris Gulch as per BLM ROD. Any habitat found to be occupied would be protected by 150 foot no treatment buffers around the identified habitat.

Great gray owl: Protect the one known great gray owl nest. This site would receive 1/4 mile protection zone (approx. 125 acres). Designate a 1/4 mile protection zone around any additional great gray nest sites found before project implementation. A seasonal restriction would be in effect from March 1 through July 15 for any treatment activities and hauling within 1/4 mile of active nest sites. This restriction could be lifted if the site is not reproductive in a given year. Provide no-harvest buffers of 300 feet around meadows and natural openings.

Goshawk: There are currently no known goshawk sites. Any identified northern goshawk nests or activity centers that are located would receive no treatment buffers of approximately 30 acres.

Bat species: Protect known bat roosting, maternity, and hibernacula sites referred to in the NWFP, and FSEIS ROD, including caves, mines, wooden bridges, and old buildings. The project contains mine adits and shafts that serve as roosts, maternity colonies and hibernacula for species of bats listed in NWFP ROD Standards and Guidelines. There are two known maternity colonies of Townsend's big-eared bats within the project area. The silvicultural prescription for this project retains large snags, which addresses protection of roosting sites for species of bats which use snags.

- All known mine sites providing potential bat habitat will have a 250 foot protection zone.
- Place a seasonal restriction on any activities that would potentially disturb the two maternity sites between Nov. 1 through September 15 to protect the bats during reproductive and hibernation periods. Activities such as harvesting, road building, log hauling, vegetative treatments, and burning would be restricted during this time in areas of potential disturbance to these sites.
- The proposed road on the Ferris Gulch ridge would be built on the other side of the ridge from a known adit in order to minimize microclimatic disturbance to bats. Close the road to public vehicle use to

minimize disturbance to the bats. The road spur leading to this mine would be decommissioned and blocked. A grate has been installed in this adit to minimize potential disturbance to bats.

- The second mine is an active placer claim. This adit would be grated if it is determined that it does not impact the claimant.

Wildlife Connectivity Corridors

Two areas outside of Riparian Reserves in T38S R4W Sec.1 and T37S R4W Sec.33, have been identified as important wildlife connectivity corridors and have prescriptions designed to retain important habitat characteristics for this function. Treatment would include maintaining a minimum canopy closure of 60 percent; retention of a minimum of four, 17" DBH or larger snags per acre, if available; existing understory brush would not be cut; and retention of all hardwoods larger than 10" DBH.

Snag Retention

Riparian Reserves would help provide refugia and travel corridors for special status and other wildlife species. Where possible, protect snags in Riparian Reserves by buffering so they can be retained rather than felled as OSHA hazard trees.

Reserve from harvest a minimum of 2 snags greater than 17" DBH per acre (where possible). Retention of all snags greater than 17 inches DBH within the interior of the stands will mitigate impacts to pileated woodpeckers, saw-whet owls, and several of the bat species that use large snags as roosts. Do not target for removal large, broken-top trees and large snags with loose bark on ridge tops. Retain and protect these structures where possible.

Non-commercial Hardwood and Brush Stands

When operationally possible, saw work will not be done in non-commercial hardwood and brush stands during the period of April - July to mitigate disturbance of nesting birds.

8. Cultural Resources

Cultural sites would be protected to retain their cultural value. If additional sites are located, these also would be protected.

A vertical mine shaft is located in the SW¼NE¼, Section 4, T38S,R4W (Approx. 150' uphill of station 193+52 on the proposed new road). For safety concerns, a structure (fence around or grate over the vertical shaft) would be constructed.

9. Invasive, Nonnative Species

To minimize the spread of weeds, vehicle movement (except for emergency or authorized administrative traffic) on gated and newly constructed roads would be limited to the dry season except on roads where alternative seasons of use are required to implement the project. Seeding of native grasses and/or adapted grasses on disturbed soil (e.g., new road construction, road ripping, log landings, prescribed burns, etc.) would be required as needed.

Canada thistle, star thistle, and bull thistle infest roadsides in a few locations in the project area. To reduce the existing population, the Ferris Bugman Project incorporates the following control treatments: insect release as bio-control, weeding by hand, and using fire to burn plants before seed release. The areas lacking native seed bank would be seeded with native grass. Unit N14 and N15 are broadcast burns in Oak woodlands for the purpose stopping the spread of yellow starthistle. Burning these areas three (3) to four (4) times would eliminate the seed source. Handpulling of these areas would occur if burning were unsuccessful.

10. Streams, Fish and Riparian Reserves

Water Quality Protection

The BLM, in cooperation with the Forest Service, ODEQ, and the Environmental Protection Agency (EPA), is

implementing the *Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters* (USDA and USDI 1999) (Protocol). Under the Protocol, the BLM agrees to protect and maintain water quality where standards are met or surpassed, and restore water-quality-limited waterbodies within their jurisdiction to conditions that meet or surpass standards for designated beneficial uses. The Protocol serves as a framework for developing water quality restoration plans, specific to BLM-administered lands, which are used to guide and can be incorporated by reference into ODEQ's WQMPs. In areas where BLM management actions have either short- or long-term effects on BLM-administered lands and adjacent waters, the BLM will work toward water quality improvement.

The BLM will also adhere to the State Antidegradation Policy (ODEQ 1992; 340-041-0026). The BLM will continue supporting ODEQ's efforts to work with land managers and designated management agencies in total maximum daily load (TMDL) development (scheduled for 2002) and implementation plans [e.g., water quality management plans (WQMPs)]. Best Management Practices (BMPs) and effectiveness monitoring as described in the Medford District RMP (USDI 1995a) would ensure that TMDLs are being met on BLM-administered lands.

Necessary federal and state permits would be obtained for any instream work. Project area streams listed under Section 303(d) are identified in Chapter 3 of this EA.

Riparian Reserve Determination

Northwest Forest Plan Riparian Reserves are located on federal lands throughout the project area. In order to ensure that all areas needing Riparian Reserve protection were covered, BLM conducted exhaustive surveys of each drainage within the Ferris-Bugman project area. The crew assessed stream condition, documented the location of wetland and unstable areas, and determined whether stream channels were perennial, intermittent, or dry draws (NWPF Standards & Guidelines, pages C30-C31; also see glossary). In addition, existing maps were corrected using the new information. For locations of Riparian Reserves, please refer to the Riparian Reserve map in the EA file, available by request.

Riparian Reserve widths were determined site-specifically using the guidelines on page C-30 and 31 of the NWFP Standards and Guidelines. Riparian Reserve widths in the Ferris-Bugman project area are as follows:

- Fish streams: between 320' and 360' on each side of the stream.
- Other perennial streams: between 160' and 180' on each side of the stream.
- Intermittent streams: between 100' and 180' on each side of the stream.
- Riparian Reserves on unstable and potentially unstable ground: cover the extent of the unstable and potentially unstable ground.
- Springs, seeps and other non-stream wetlands less than one acre in size: 100' slope distance from the edge of the wetland and associated vegetation. Note that the Northwest Forest Plan only requires Riparian Reserves to extend to the edge of the wetland and associated vegetation for such areas. We have increased the size of the Riparian Reserves around springs, seeps, and other non-stream wetlands less than one acre in size for the Ferris-Bugman project.

Thinning From Below in Riparian Reserves Thinning commercial-sized trees in Riparian Reserves would be limited to only a few small areas that need thinning to meet Aquatic Conservation Strategy Objectives. All of these units are on intermittent streams without healthy riparian areas. See *Appendix R* for details on the locations and the treatment proposed in Riparian Reserves. The following PDF's would also apply:

- A fish biologist or hydrologist would be the marking crew lead.
- There would be a minimum "no cut" buffer of 50 feet on each side of the stream channel (all intermittents)*.
- No trees over 16 inches DBH would be cut or removed, and trees <12" dbh are the focus of the thinning prescription.
- All snags and horizontally leaning trees including OSHA safety trees would be left on site. If snags or horizontally leaning trees are felled for safety reasons, they would remain on the site.

- In conifer stands lacking 120 lineal feet of 16" diameter decay class 1, mark one tree of every typical marking diameter every 500 to 1000 feet to be felled toward the stream and left on the ground. The objective is to improve size and decay class distributions of woody material in the stream channel for sediment control and aquatic habitat diversity, and in the outer portion of the Reserve for wildlife and plant habitat*.
- Leave *all* hardwoods, especially riparian-dependant species (e.g. alder, ash, maple).

Pre-commercial Thinning (PCT) in Riparian Reserves

PCT would only take place in Reserves that need PCT to meet Aquatic Conservation Strategy Objectives, and are adjacent to PCT units.

- Prior to implementation of any PCT units, resource specialists (hydrologist, fisheries, and wildlife biologists) will review sites to assure compliance with the Aquatic Conservation Strategy objectives*.
- PCT would not take place within the riparian area (at least 25 feet from the wetted edge on each side of the stream)*.
- Riparian hardwood species such as willow, ash, maple, alder, black oak would not be cut*. Other important hardwoods unique to each site (e.g. mountain mahogany) would also be protected.
- Thinned material would be "lopped and scattered" when possible in an effort to reduce the need for pile burning*. (See "Handpile Burning in Riparian Reserves" below for more information.)

Handpiling in Riparian Reserves

Some handpiling and subsequent pile burning may occur in PCT within Riparian Reserves. If handpile burning takes place in Riparian Reserves, handpiles would not be burned within the functioning riparian area, at least 25 feet from the wetted edge and probably greater (e.g., 50 feet).* Areas designated as "no handpile burning areas" would be wider on V-shaped streams with steep side slopes in order to reduce sedimentation risks.* Wherever possible, brush and small trees would be "lopped and scattered" to reduce fuels hazard.

Broadcast and Underburning in Riparian Reserves

Restrictions would be the same as above for commercial and silviculture PCT sites. In addition, all of the areas planned for fuels treatment would be visited by resource specialists to determine if fuels treatment is appropriate for an adjacent Riparian Reserve, to determine the width of a "no treatment" buffer, or to design a slightly different fuels prescription.* For example, broadcast burn units may be lit by hand, as opposed to helicopter, in order to better control fire near Riparian Reserves.* Broadcast burns would be visited and monitored by resource specialists.

With underburns, no ignition would occur within Riparian Reserves*. A fire may be allowed to "back down" into a Reserve, especially into the non-riparian portions with fire-dependant vegetation such as Ceanothus and white oak. This would depend on a site-specific analysis. Fire lines would be avoided in Riparian Reserves in order to prevent the creation of "mini roads" that could route sediment into the creek.* Foam would not be used in Riparian Reserves.*

11. Non Federal Improvements

Authorizations of non federal improvements on Public Land would be protected.

Identified non-motorized trails would be protected (e.g., Enchanted Forest, Felton Memorial, Packers Gulch).

D. ALTERNATIVE 3: VARIABLE PRESCRIPTION WITH REDUCED TRANSPORTATION MANAGEMENT

Alternative 3 is the same as the Proposed Action (Alternative 2) except there would be no new road construction, a reduced amount of road decommissioning, and the thinning acres would be reduced. The acreage of commercial conifer stands would be reduced to 1,195 acres; the pre-commercial thinning would be reduced to 107 acres; the

non-commercial thinning of hardwood and brush stands would be reduced to 920 acres. Details of this action alternative are listed in Appendix A.

The following PDFs apply to this Alternative to the Proposed Action.

1. Roads and Helicopter Landings

The availability of roads has a direct impact on the types of yarding systems used.

Road Decommissioning. Some existing roads would be decommissioned as listed in Appendix A. Road decommissioning would normally occur the final dry season (usually May 15 to October 15) of the contract in order to reduce the amount of soil disturbance occurring in one season as a result of road work.*

Stream crossings would be reestablished to the natural stream gradient and valley form.* This would be accomplished by removing the culvert and the road fill within the stream crossing areas. Stream side slopes would be reestablished to natural contours.* Excavated material would be removed from stream crossing areas and placed at stable locations.*

Ground-disturbed areas on all decommissioned roads would be seeded with native or approved seed, and mulched.*

Types of decommissioning are as follows:
- Natural Decommission - Some roads are presently well drained and have vegetation growing on them. They may also have trees and brush encroaching from the sides and trees that have fallen across them. Sections of these roads would be allowed to decommission naturally but may include some selective ripping, removal of drainage structures, construction of water bars and barricades.*
- Mechanical Decommission - Roads would be decommissioned mechanically. This usually includes ripping, removing drainage structures, seeding and/or planting, mulching, constructing water bars and barricades.*

Helicopter landings.
The construction of helicopter landings would normally occur during the dry season (May 15 to Oct.. 15)*. No construction of new landings or expansion of old landings would be allowed in Riparian Reserves*.

Helicopter landings on BLM administered land would be treated to reduce soil erosion*. Treatment of the running surface would be dependent on site conditions and would include one of the following:
- Subsoil/till or rip, then mulch and seed with native grasses or other approved seed*.
- Surface with durable rock material*.
- No treatment would be necessary where adequate quality and quantity of natural rock exists.

Fill slopes of helicopter landings would be seeded with native grasses or other approved seed mixes and mulched, except where rock occurs*.

Hauling Restrictions. A seasonal hauling restriction would be required on natural surfaced (dirt) roads during the wet season (usually October 15 to May 15).* This would protect the road from damage and decrease the amount of sedimentation that would normally occur. Some variations in these dates would be permitted dependent upon weather and soil moisture conditions of the roads. Refer to Appendix A for all hauling seasonal restrictions.

Rock Surfacing and Quarries. Rock would be used to stabilize and minimize erosion on selected roads and landings.* Rock would be obtained from one or more of the following existing quarries which are located in SW1/4 Section 8, T38S, R3W; SW1/4 Section 27, T37S, R4W; and NW1/4 Section 31, T38S, R4W.

Dust Abatement. Dust abatement would provide driver safety and protect the road surface by stabilizing and binding the aggregate road surface.* Water, lignin, magnesium chloride, road oil, or Bituminous Surface Treatment (BST) would be used.

Road Maintenance. Roads would be maintained on a long-term basis.* Minor improvements and design changes may be needed to stabilize and correct conditions that are causing erosion or unsafe situations.*

Road Use Agreements. Existing road agreements for access are between private companies and BLM. Road use agreements M-660, M-2000, and M-800 would be used for access to BLM administered land.

Culvert Installation/Replacement. Instream work period would be from July 1 - September 15 on actively flowing streams.*

At all stream crossings the approach would be as near a right angle to the stream as possible to minimize disturbance to streambanks and riparian habitat.*

Stream crossing culverts that are replaced would be sized to accommodate 100-year flood events.*

Projects would be designed to ensure upstream movement of aquatic species.*

Fill material over stream crossing structures would be stabilized as soon as possible after construction has been completed, normally before October 15. Exposed soils would be seeded and mulched. Work would be temporarily suspended if rain saturates soils to the extent that there is potential for environmental damage, including movement of sediment from the road to the stream.*

Location of waste stockpile and borrow sites would not be located within Riparian Reserves.*

The contractor would be notified that he is responsible for meeting all state and federal requirements for maintaining water quality. Standard contract stipulations would include the following:

- Heavy equipment would be inspected and cleaned before moving onto the project site in order to remove oil and grease, invasive, non-native species (for example, noxious weeds) and excessive soil.*
- Hydraulic fluid and fuel lines on heavy mechanized equipment must be in proper working condition in order to prevent leakage into streams.*
- Waste diesel, oil, hydraulic fluid and other hazardous materials and contaminated soil near the stream would be removed from the site and disposed of in accordance with Department of Environmental Quality (DEQ) regulations.* Areas that have been saturated with toxic materials would be excavated to a depth of 12 inches beyond the contaminated material or as required by DEQ.*
- Equipment refueling would be conducted within a confined area outside Riparian Reserves.*
- Use spill containment booms or other equipment as required by DEQ.*
- At no time would mechanical equipment be stored in the Riparian Reserves.*

2. Range

The Billy Mountain Allotment #20203 is located within the project area. Livestock preference is for 129 cattle from 4/16 to 6/30. Existing fences would need to be protected from logging activity by felling away from fences. Care would be taken to protect rangeland improvements in the fire hazard reduction units.

3. Harvest and Logging Systems

In order to minimize loss of soil productivity, soil damage, compaction and displacement, the project would employ all pertinent Best Management Practices relative to soils found under Fragile Soils, Roads and Landings, Timber Harvest and Silviculture found in the Medford District's ROD and RMP (USDI 1995a), and also the SEIS

ROD.

All ground based logging, cable logging and loading equipment would be cleaned prior to operation on government land to prevent the spread of noxious weeds. Only logging systems which meet all of the project design features would be used in these projects.*

All landing locations would be approved by BLM. Landing size would be kept to a minimum. Normally, this would be less than ¼ acre for tractor and cable units, and less than one (1.0) acre for helicopter units. No helicopter landing construction would occur within ¼ mile of known mine adits. No new landings would be constructed in Riparian Reserves.* Any existing landings within Riparian Reserves would not be expanded and would be evaluated carefully before use.*

When operationally feasible, all units would be yarded in such a way that the coarse woody debris remaining after logging would be maintained at or greater than current levels in order to protect the surface soil and maintain productivity.*

Wherever trees are cut to be removed, directional felling away from Riparian Reserves, dry draws and irrigation ditches would be practiced.* Maximum operational suspension would be practiced to alleviate gouging and other disturbance on draw side slopes and headwalls.* Skyline and tractor yarding would be avoided in draw bottoms*. The intent is to minimize occurrence of erosion in existing areas of concentrated surface flow.

Trees would be felled to the lead in relation to the skid trails. The intent of falling to the lead is to minimize the yarding damage to leave trees and regeneration under conventional yarding systems.

For all cable yarding, maximum operational suspension would be maintained on slopes greater than 50 percent. Minimum corridor widths *(*generally less than 15 feet in width) would be utilized to assure silvicultural prescriptions and objectives are met. No yarding corridors would be located in Riparian Reserves.* Trees would be felled towards the yarding corridors.

Tractor yarding would normally occur between May 15 to October 15 or on approval by the Contract Administrator. Some variations in these dates would be permitted dependent upon weather and soil moisture conditions. The intent is to minimize off-site erosion and sedimentation to local waterways.

For all tractor yarding, skid trail locations would be approved by BLM. Skid trail locations would avoid ground with slopes over 35 percent and any areas with high water tables.* Maximum unit area in skid trails would be less than 12 percent.* Existing skid trails would be utilized when possible.* Tractors would be equipped with integral arches to obtain one end log suspension during skidding of logs.* Every effort would be made to maintain canopy cover over skid trails.* The intent is to minimize areas affected by tractors and other mechanical equipment (disturbance, particle displacement, deflection, and compaction) and thus minimize soil productivity loss. The intent is also to minimize off-site erosion and sedimentation to local waterways.*

All skid trails would be water barred utilizing the spacing and construction techniques outlined on page 167 of the Medford District RMP (USDI 1995a).* Main tractor skid trails would be blocked with an earth and log barricade where they intersect haul roads.* The intent is to minimize erosion and routing of overland flow to streams by decreasing disturbance.

Noise disturbance to local residents would be partially mitigated by regulating operating hours, days, and seasons through portions of the project area. Generally, any helicopter logging closer than ½ mile of a residence would be restricted to an operating period of 8:00 a.m. to 5:00 p.m., Monday through Friday. Any helicopter logging located ½ to one (1.0) mile from a residence would be restricted to an operating period of 6:00 a.m. to 6:00 p.m., Monday

through Saturday; and no operating time restriction would be enforced when helicopter operations are greater than 1.0 (one) mile from a residence.

To maintain the stability of colluvial layers in draw bottoms, large trees would not be cut in bottoms of (non-Riparian Reserve) dry draws.* Smaller trees and vegetation would be thinned to reduce understory fuel load in these areas, to prevent loss of the larger trees in fire events.*

Pipeline rights-of-way in the project area would be protected from damage. An attempt would be made to protect any known pipelines outside of existing rights-of-way (see Appendix H), but protection cannot be assured if the pipeline owner has no legal right-of-way.

4. Fuels Treatment

Portion of Units N8 and N9 are in Soil Category 1, all other units are in Soil Category 2. (Soil Category is a system of classification used by fuel managers to rate sensitivity of soil to burning. Class 1 is highly sensitive). Consequently, burning would only occur in spring-like conditions when the soil and duff are moist. Assure retention of minimum levels of coarse woody debris and recruitment snags as specified in the Standards and Guidelines on page C-40 in the SEIS ROD. All fuel management activities which would occur within the project area would meet Aquatic Conservation Strategy and Riparian Reserve objectives.

Ensure that fingers of unburned material are scattered over the units. If necessary, these refugia would allow for the reintroduction of soil organisms into adjacent areas that may have burned too hot. The pattern of unburned islands of duff is important. These fingers of unburned material would be oriented parallel to topographic features such as creeks, draws and ridges.

Due to the impacts to soil organisms, hand piling and burning piled slash would be considered as a treatment alternative only where current fuel loading is too high to consider under-burning (i.e., low-to-moderate intensity burning could not be achieved), or where under-burning would not be economically or operationally feasible. This may be due to the unit being adjacent to private property or to the lack of control areas such as roads, streams or wet areas, natural topographic breaks or barriers.

Any areas planned for fuels treatment may be reexamined by resource specialists at any stage of treatment to determine if the planned fuels treatment is still applicable. At the discretion of resource specialists, planned treatments may be changed to better meet the objectives outlined in this EA. Proposed changes will be limited to treatments allowed under this EA or amendments to this EA.

Future maintenance of all treated areas would maintain low fuel loadings and fire-dependent species. Underburning (conifer stands) and broadcast burning (woodlands and grasslands) would be the preferred methods for maintaining these areas.

Prescribed burning operations would follow requirements of the Oregon Smoke Management Plan and the Department of Environmental Quality Air Quality and Visibility Protection Program. Prescribed burning includes underburning, broadcast, and handpile burning.

Measures to reduce the potential level of smoke emissions from proposed burn sites would include completing mop up as soon as practical after the fire, facilitating quick and complete combustion of smaller fuels by burning them with lower fuel moisture, minimizing consumption and burn out time of larger fuels by burning them at higher fuel moisture, and covering hand piles so that burning is possible during the rainy season when there is a stronger possibility of atmospheric mixing and/or scrubbing of smoke.

The treatment of fuels is proposed throughout the entire landscape of the project area. Strategic areas such as

major ridge lines are targeted for treatment in order to fragment continuous fuels found throughout the project area. The use of prescribed fire and thinning would reinforce these natural features which would aid in the suppression of wildfires. Four major ridge lines are proposed for treatment. The treatment of the proposed units in Ferris Gulch would reinforce the west flank of an existing shaded fuel break which is located on the ridge line that separates Thompson Creek and Ferris Gulch. The ridge line that separates Ferris Gulch from the Williams Valley would also be treated. The ridge line which runs from Blue Mountain to Billy Mountain and separates Slagle Creek from Humbug Creek is also proposed for treatment. The other major ridge line proposed for treatment is the ridge line that separates Humbug Creek from Long Gulch.

The commercial thinning of timber stands under this project would reduce the aerial component of fuels that is currently present. The fuels reduction work proposed for all of these stands would reduce the ladder and surface fuels. This type of work is proposed in order to reduce the current fuel hazard which exists and to mitigate the increased fuel loadings created by thinning operations.

Fuels have accumulated within these stands, due to the absence of fire, which precludes single entry fuels treatment in most areas. The energy release from prescribed fire as the initial entry would exceed desired intensity levels and have undesirable effects on vegetation and soil. A combination of mechanical or manual treatments with prescribed fire is necessary to insure all resource objectives are met.

An array of fuel treatments can be utilized in these stands to modify vegetative patterns and reduce high fuel levels. Factors such as existing and projected fuel loadings, existing vegetative conditions, slope, and access have to be taken into consideration for prescribing the type of fuels management treatment that should be implemented. These treatments include mechanical methods, manual treatments, prescribed burning, or a combination of these treatments.

To minimize loss in soil productivity and surface erosion, the average unit slope for mechanical operations would be less than 35%.* The maximum slope for the slashbuster would be 45%, but only on short pitches less than 300 feet. Any mechanical operations on fragile soils (as shown on the BLM GIS Soils mapping or identified by the Soil Scientist) would be limited to slopes of 25% or less.*

Manual treatment of fuels consist of hand cutting of existing ladder fuels and then hand piling this material so it can be burned. This type of treatment would be utilized in the majority of stands. The manual treatment of fuels normally is completed in commercially thinned units within one year of when a unit has been harvested.

Prescribed burning in these timber stands includes underburning and handpile burning. Handpile burning would be used as the initial entry for burning in the majority of stands. High fuel loadings in these areas make underburning not possible due to the high probability of mortality to the residual stand. This type of burning takes place in the late fall and winter. Handpile burning takes place in the late fall and winter and is done after fuels have cured for one summer. Underburning is the preferred method of fuels reduction work in stands of conifers and hardwoods. Underburning is a low intensity surface fire which can be highly effective in reducing a large amount of surface fuels and some ladder fuels. This type of burning would be used in some stands as the initial entry but in most stands it would be the follow up treatment after handpile burning. Underburning occurs in late fall and spring. This type of burning is done after fuels have cured for one season.

As previously discussed, fire is recognized as playing an important role in the development and maintenance of vegetative diversity in fire prone ecosystems as found throughout the project area. Prescribed fire is a tool which would be used to meet objectives for vegetative communities such as grasslands, shrublands and oak woodlands. In the grasslands prescribed fire would be used for the improvement of native grass/annual grass mix to a more native grass domination and assist in the restoration of annual grass monoculture to a native grass domination. In the shrublands, prescribed fire would help recreate a range of wedgeleaf ceanothus stand ages across the landscape.

The use of prescribed fire in the Woodlands would help restore tree composition due to the invasion of conifers. The balance of herbaceous plants, shrubs and trees could also be restored in the woodlands. Fire would also assist in the thinning of white oak stands to historic tree densities.

High fuel loadings, due to the absence of fire, preclude single entry fuels treatment in some of shrublands and oak woodlands. Mechanical and manual treatment of fuels described previously are proposed for the initial treatment so that prescribed fire can then be used to meet resource objectives.

Broadcast burning and underburning is proposed as the initial treatment for some grasslands and shrublands to restore native vegetation and modify seral stages in vegetative communities. This type of burning would normally occur in the late summer, fall or early winter.

Future maintenance of all areas treated in the project area would be needed in order to maintain low fuel loadings and species dependent on fire. Underburning and broadcast burning are the preferred methods for maintaining these areas.

5. Mechanical chipping and thinning on noncommercial woodland and shrub stands.
In order to provide for escape, hiding, thermal, and nesting cover for a variety of species, 15-20% of the proposed area will be left in an untreated condition within the noncommercial woodland and shrub stands. These deferral reserves would be at least three acres in size and covering a variety of vegetative conditions.

To minimize loss in soil productivity and surface erosion, the average unit slope for mechanical operations would be less than 35%.* The maximum slope for the slashbuster would be 45%, but only on short pitches less than 300 feet. Any mechanical operations on fragile soils (as shown on the BLM GIS Soils mapping or identified by the Soil Scientist) would be limited to slopes of 25% or less.*

Old skidroads would not be opened or driven on without the approval of the authorized officer.* Cut material or slashbuster material would be placed on the running surface of old skid roads or jeep roads that are authorized to be used or are encountered during operations, to provide a cover/mulch layer over exposed soil.* Old skidroads would not be treated near the intersections with system roads in order to provide a visual screen and discourage vehicular access.*

6. Special Status Plant Species, Species to be Protected Through Survey and Manage Guidelines, and Protection Buffer Species
Special Status Plant and Animal Species are species that are Federally listed, proposed, or candidates for listing by the U.S. Fish and Wildlife Service, including species the BLM considers Special Status Species (i.e. sensitive species, assessment species, tracking and watch species). A list of the Special Status Plant List and their BLM status is included in the Appendix.

Bureau Sensitive species and their habitats would be managed, protected and conserved so that the proposed action would not contribute to the need to list these species.

The following actions would be taken to protect special status species in the project area:

c. *Fritillaria gentneri:* There is one occurrence within the proposed harvest unit Bugman #15, T38S, R4W, SEC 13, and one occurrence on the edge of the proposed burn unit in T38S, R3W, SEC 7, NW1/4. Both sites would receive a 150 feet radius buffer.
d. *Arabis modesta:* The one known occurrence within the proposed harvest unit Slagle #16, T38S, R4W, SEC 5, would receive a 100 to 150 feet variable radius buffer.
e. *Clarkia heterandera*: This species occurs in shady sites in foothill woodland, yellow pine forest, and chaparral communities ranging in elevation from 1500-5100 ft. There is one known occurrence within the

proposed harvest unit Ferris Gulch #16 , T38S, R4W, SEC 18. Selective removal of overstory trees to a minimum of 40% canopy closure would be allowed within the population boundaries of the *Clarkia heterandera* population in question. Logging systems would be laid out under the guidance of a botanist to minimize disturbance to individual plants. Trees that can be felled away from individual *Clarkia heterandera* plants and removed via conventional skidding, without damage to such plants, would be removed by this method. Any trees that cannot be removed without meeting these two criteria will be removed by helicopter.

f. *Cypripedium fasciculatum:* Known sites exist within the following units: Bugman #6, T38S, 4W, SEC 1 (3 sites), Bugman #8, T38S, 4W, SEC 12 (3 sites), Bugman #10, T38S, R3W, SEC's 7 & 12 (5 sites), Bugman #11, T38S, R3W, SEC 7 (3 sites) Bugman #13 & #14, T38S, R4W, SEC 13, T38S, R3W, 18 (11sites), Bugman #15, T38S, R4W, SEC 13 (2 sites), Ferris Gulch # 4, T38S, R4W, SEC 29 (1 site), Slagle #3, T37S, R4W, SEC 33 (1site), Slagle #8, T38S, R4W, SEC 33 (2 sites), and Slagle #19, T38S, R4W, SEC 4 (2 sites). In addition there are three sites in or on the edge of the proposed burn units in T38S, R4W, SEC 9 and one site in the proposed burn unit in T38S, R4W, SEC 1. These sites would receive a 100 to 150 feet variable radius buffer.
g. *Festuca elmeri:* The three known occurrences within the proposed harvest unit Slagle #8, T38S, R4W, SEC 9 and T38S, R4W, SEC 3 , and the five known occurrences in the proposed burn unit in T38S, R4W, SEC 9 would receive a 100 to 150 feet variable radius buffer.
h. *Meconella oregana:* The one known occurrence within the proposed harvest unit Slagle #16 , T38S, R4W, SEC 5, would receive a 100 to 150 feet variable radius buffer.
i. *Mimulus bolanderi:* The two known occurrences in the proposed burn unit in T38S, R4W, SEC 9 would receive a 100 to 150 feet radius buffer.
j. *Sedum oblanceolatum:* There is one known occurrence within each of following proposed harvest units,Bugman #1, T37S, R3W, SEC 31, Bugman #5, T38S, R3W, SEC 6, Bugman #7, T38S, R4W, SEC 1, and Slagle #8, T38S, 4W, SEC 9, one known occurrence within the proposed burn unit in T38S, R4W, SEC 12, and two occurrences in the proposed burn unit in T38S, R3W, SEC 7. These sites would receive a 100 to 150 feet variable radius buffer.
k. *Bryoria tortuosa:* The 13 occurrences in the following proposed harvest units; Bugman #12, T38S,R3W, SEC 7 (1site), Bugman #6, T38S, R4W, SEC 1 (1 site), Ferris Gulch #10, T38S, 4W, SEC 19 (1 site) Ferris Gulch #13, T38S, R4W, SEC 19 (5 sites), Ferris Gulch #17, T38S, 4W, SEC 20 (1 site), Ferris Gulch #8, T38S, R4W, SEC 30 (2 sites), Slagle #3, T37S, 4W, SEC 33 (1 site), and Slagle #12, T38S, R4W, SEC 33 (1 site) and the one occurrence in the proposed burn unit in T38S, 4W, SEC 7, NE1/4 would receive a 100 feet radius buffers.
l. *Dendriscocaulon intricatulum:* The three occurrences in the following proposed proposed harvest units; Bugman #6, T38S, R4W, SEC 1 (1 site) and Bugman #12, T38S, R3W, SEC 7 (2 sites), would receive 100 feet radius buffers.

7. Wildlife

Threatened/Endangered Wildlife. *Northern spotted owls:* Reserve from harvest the designated 100-acre core areas for 4 northern spotted owl sites which were designated as known sites on 1/1/94. Place a seasonal restriction on harvest activities within 0.25 miles of the center of activity for the owl sites. This restriction would be in effect from March 1 through June 15 for disturbance activities, such as hauling, and from March 1 through September 30 for removal of habitat within the restricted area. This restriction could be lifted on an annual basis if protocol surveys by the BLM indicate that the site is not reproductive in a given year.

Any new pairs of spotted owls found before or during the sale contract period adopt the same seasonal restriction as outlined above.

Special Status Species and Species to be Protected Through Survey and Manage Guidelines. In the project area surveys for great gray owls, red tree voles, and mollusks have been completed to the standards outlined in the

NWFP, Survey and Manage guidelines as amended in Jan. 2001. Surveys found no red tree vole nests or survey and manage mollusk species in the project area. If any species are found prior to implementation, they would be protected as outlined in the NWFP.

Siskiyou mountains salamander: Protect two known Siskiyou mountains salamander sites in Ferris Gulch as per BLM ROD. Any habitat found to be occupied would be protected by 150 foot no treatment buffers around the identified habitat.

Great gray owl: Protect the one known great gray owl nest. This site would receive 1/4 mile protection zone (approx. 125 acres). Designate a 1/4 mile protection zone around any additional great gray nest sites found before the implementation date. This restriction could be lifted if the site is not reproductive in a given year. A seasonal restriction would be in effect from March 1 through July 15 for any treatment activities and hauling within 1/4 mile of active nest sites. Provide no-harvest buffers of 300 feet around meadows and natural openings.

Goshawk: There are currently no known goshawk sites. Any identified northern goshawk nests or activity centers that are located would receive no treatment buffers of approximately 30 acres.

Bat species: Protect known bat roosting, maternity, and hibernacula sites referred to in the NWFP, and FSEIS ROD, including caves, mines, wooden bridges, and old buildings. The project contains mine adits and shafts that serve as roosts, maternity colonies and hibernacula for species of bats listed in NWFP ROD Standards and Guidelines. There are two known maternity colonies of Townsend's big-eared bats within the project area. The silvicultural prescription for this project retains large snags, which addresses protection of roosting sites for species of bats which use snags.

- All known mine sites providing potential bat habitat will have a 250 foot protection zone.
- Place a seasonal restriction on any activities that would potentially disturb the two maternity sites between Nov. 1 through September 15 to protect the bats during reproductive and hibernation periods. Activities such as harvesting, log hauling, vegetative treatments, and burning would be restricted during this time in areas of potential disturbance to these sites.
- The second mine is an active placer claim. This adit would be grated if it is determined that it does not impact the claimant.

Wildlife Connectivity Corridors

Two areas outside of Riparian Reserves in T38S R4W Sec.1 and T37S R4W Sec.33, have been identified as important wildlife connectivity corridors and have prescriptions designed to retain important habitat characteristics for this function. Treatment would include minimum canopy closure of 60 percent; retention of a minimum of four, 17" DBH or larger snags per acre, if available; existing understory brush would not be cut; and retention of all hardwoods larger than 10" DBH.

Snag Retention

Riparian Reserves would help provide refugia and travel corridors for special status and other wildlife species. Where possible, protect snags in Riparian Reserves by buffering so they can be retained rather than felled as OSHA hazard trees.

Reserve from harvest a minimum of 2 snags greater than 17" DBH per acre (where possible). Retention of all snags greater than 17 inches DBH within the interior of the stands will mitigate impacts to pileated woodpeckers, saw-whet owls, and several of the bat species that use large snags as roosts. Do not target for removal large, broken-top trees and large snags with loose bark on ridge tops. Retain and protect these structures where possible.

Non-commercial Hardwood and Brush Stands

When operationally possible, saw work will not be done in non-commercial hardwood and brush stands during the period of April - July to mitigate disturbance of nesting birds.

8. Cultural Resources
Cultural sites would be protected to retain their cultural value. If additional sites are located, these also would be protected.

9. Invasive, Nonnative Species
To minimize the spread of weeds, vehicle movement (except for emergency or authorized administrative traffic) on gated roads would be limited to the dry season except on roads where alternative seasons of use are required to implement the project. Seeding of native grasses and/or adapted grasses on disturbed soil (e.g., road ripping, log landings, prescribed burns, etc.) would be required as needed.

Canada thistle, star thistle, and bull thistle infest roadsides in a few locations in the project area. To reduce the existing population, the Ferris Bugman Project incorporates the following control treatments: insect release as bio-control, weeding by hand, and using fire to burn plants before seed release. The areas lacking native seed bank would be seeded with native grass. Unit N14 and N15 are broadcast burns in Oak woodlands for the purpose stopping the spread of yellow starthistle. Burning these areas three (3) to four (4) times would eliminate the seed source. Handpulling of these areas would occur if burning were unsuccessful.

10. Streams, Fish and Riparian Reserves
Water Quality Protection
The BLM, in cooperation with the Forest Service, ODEQ, and the Environmental Protection Agency (EPA), is implementing the *Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters* (USDA and USDI 1999) (Protocol). Under the Protocol, the BLM agrees to protect and maintain water quality where standards are met or surpassed, and restore water-quality-limited waterbodies within their jurisdiction to conditions that meet or surpass standards for designated beneficial uses. The Protocol serves as a framework for developing water quality restoration plans, specific to BLM-administered lands, which are used to guide and can be incorporated by reference into ODEQ's WQMPs. In areas where BLM management actions have either short- or long-term effects on BLM-administered lands and adjacent waters, the BLM will work toward water quality improvement.

The BLM will also adhere to the State Antidegradation Policy (ODEQ 1992; 340-041-0026). The BLM will continue supporting ODEQ's efforts to work with land managers and designated management agencies in total maximum daily load (TMDL) development (scheduled for 2002) and implementation plans [e.g., water quality management plans (WQMPs)]. Best Management Practices (BMPs) and effectiveness monitoring as described in the Medford District RMP (USDI 1995a) would ensure that TMDLs are being met on BLM-administered lands.

Necessary federal and state permits would be obtained for any instream work. Project area streams listed under Section 303(d) are identified in Chapter 3 of this EA.

Riparian Reserve Determination
Northwest Forest Plan Riparian Reserves are located on federal lands throughout the project area. In order to ensure that all areas needing Riparian Reserve protection were covered, BLM conducted exhaustive surveys of each drainage within the Ferris-Bugman project area. The crew assessed stream condition, documented the location of wetland and unstable areas, and determined whether stream channels were perennial, intermittent, or dry draws (NWPF Standards & Guidelines, pages C30-C31; also see glossary). In addition, existing maps were corrected using the new information. For locations of Riparian Reserves, please refer to the Riparian Reserve map in the EA file, available by request.

Riparian Reserve widths were determined site-specifically using the guidelines on page C-30 and 31 of the NWFP Standards and Guidelines. Riparian Reserve widths in the Ferris-Bugman project area are as follows:

- Fish streams: between 320' and 360' on each side of the stream.

- Other perennial streams: between 160' and 180' on each side of the stream.
- Intermittent streams: between 100' and 180' on each side of the stream.
- Riparian Reserves on unstable and potentially unstable ground: cover the extent of the unstable and potentially unstable ground.
- Springs, seeps and other non-stream wetlands less than one acre in size: 100' slope distance from the edge of the wetland and associated vegetation. Note that the Northwest Forest Plan only requires Riparian Reserves to extend to the edge of the wetland and associated vegetation for such areas. We have increased the size of the Riparian Reserves around springs, seeps, and other non-stream wetlands less than one acre in size for the Ferris-Bugman project.

Thinning From Below in Riparian Reserves Thinning commercial-sized trees in Riparian Reserves would be limited to only a few small areas that need thinning to meet Aquatic Conservation Strategy Objectives. All of these units are on intermittent streams without healthy riparian areas. See *Appendix R* for details on the locations and the treatment proposed in Riparian Reserves. The following PDF's would also apply:

- A fish biologist or hydrologist would be the marking crew lead.
- There would be a minimum "no cut" buffer of 50 feet on each side of the stream channel (all intermittents)*.
- No trees over 16 inches DBH would be cut or removed, and trees <12" dbh are the focus of the thinning prescription.
- All snags and horizontally leaning trees including OSHA safety trees would be left on site. If snags or horizontally leaning trees are felled for safety reasons, they would remain on the site.
- In conifer stands lacking 120 lineal feet of 16" diameter decay class 1, mark one tree of every typical marking diameter every 500 to 1000 feet to be felled toward the stream and left on the ground. The objective is to improve size and decay class distributions of woody material in the stream channel for sediment control and aquatic habitat diversity, and in the outer portion of the Reserve for wildlife and plant habitat*.
- Leave *all* hardwoods, especially riparian-dependant species (e.g. alder, ash, maple).

Pre-commercial Thinning (PCT) in Riparian Reserves
PCT would only take place in Reserves that need PCT to meet Aquatic Conservation Strategy Objectives, and are adjacent to PCT units.

- Prior to implementation of any PCT units, resource specialists (hydrologist, fisheries, and wildlife biologists) will review sites to assure compliance with the Aquatic Conservation Strategy objectives*.
- PCT would not take place within the riparian area (at least 25 feet from the wetted edge on each side of the stream)*.
- Riparian hardwood species such as willow, ash, maple, alder, black oak would not be cut*. Other important hardwoods unique to each site (e.g. mountain mahogany) would also be protected.
- Thinned material would be "lopped and scattered" when possible in an effort to reduce the need for pile burning*. (See "Handpile Burning in Riparian Reserves" below for more information.)

Handpiling in Riparian Reserves
Some handpiling and subsequent pile burning may occur in PCT within Riparian Reserves. If handpile burning takes place in Riparian Reserves, handpiles would not be burned within the functioning riparian area, at least 25 feet from the wetted edge and probably greater (e.g., 50 feet).* Areas designated as "no handpile burning areas" would be wider on V-shaped streams with steep side slopes in order to reduce sedimentation risks.* Wherever possible, brush and small trees would be "lopped and scattered" to reduce fuels hazard.

Broadcast and Underburning in Riparian Reserves
Restrictions and would be the same as above for commercial and silviculture PCT sites. In addition, all of the areas planned for fuels treatment would be visited by resource specialists to determine if fuels treatment is appropriate for an adjacent Riparian Reserve, to determine the width of a "no treatment" buffer, or to design a

slightly different fuels prescription.* For example, broadcast burn units may be lit by hand, as opposed to helicopter, in order to better control fire near Riparian Reserves.* Broadcast burns would be visited and monitored by resource specialists.

With underburns, no ignition would occur within Riparian Reserves*. A fire may be allowed to "back down" into a Reserve, especially into the non-riparian portions with fire-dependant vegetation such as Ceanothus and white oak. This would depend on a site-specific analysis. Fire lines would be avoided in Riparian Reserves in order to prevent the creation of "mini roads" that could route sediment into the creek.* Foam would not be used in Riparian Reserves.*

11. Non Federal Improvements
Authorizations of non federal improvements on Public Land would be protected.

Identified non-motorized trails would be protected (e.g., Enchanted Forest, Felton Memorial, Packers Gulch).

E. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM ANALYSIS
In addition to the alternatives analyzed in this EA, the ID team considered other alternatives that could move the ecosystem in this area towards a healthy, sustainable condition. Below is a description of each alternative considered and why it was dismissed from detailed analysis.

1. Construct enough roads in the project area to conventionally harvest (no helicopters) trees on commercial forest land in the entire area.
This alternative was eliminated because of social and biological reasons. Socially, there is local resistance to new road construction. Residents are concerned about indirect impacts from roads. Those impacts include increased noise from off-highway vehicles, potential wildfire ignition from off-highway vehicles, use of firearms behind and adjacent to residences, and the visual impacts of roads. Biologically, constructing enough roads to conventionally harvest the project area would increase impacts to waterways, aquatic wildlife, terrestrial wildlife, and soils.

2. Acquire private access for potential helicopter sites to avoid any new proposed road.
This alternative was eliminated because private landowners and BLM could not agree with conditions for permanent access for BLM. To bring the private access up to BLM standards (as required by ACS) and standard conservation measures required by the Threatened & Endangered Species Act, BLM would need to make major capital improvements on the private lands. BLM regulations do not authorize major capital improvements on private land for temporary easements.

3. Access the southern ridge of Slagle Creek and the northwest portion of Humbug Creek by constructing a road off of North Applegate Road (Section 7, T38S,R4W). This route was eliminated because of; 1) the social (visual) impact from creating a scar on the hillside as viewed from Hwy 238 and North Applegate Road, 2) the environmental impact of road construction through granitic soils. This route would cross steep, dissected draws until it reached the ridge top.

4. Road access to Unit S16 from the end of the proposed road. This portion of the road was dropped due to environmental impacts associated with construction across unstable granitic soils. At station 263+55, two small adjacent scarps are located in a draw above the P-line; this area is underlain by granitic bedrock. Land use classification of this site of instability was changed to Riparian Reserve.

5. Access the southern ridge of Slagle Creek with a road along the north-facing side of the slope. This north-facing route was eliminated due to a small-in-extent area of past slope instability. At approximately Station 151+00, leaning trees and a small slump were traversed by the P-line. Only the largest trees leaned, implying that this area has been stable for the last 30-40 years at a minimum. After discussion with the road engineer this

section of proposed road was relocated to the other side of the ridge. Note that station 151+00 is located on Caris-Offenbacher soils. The Middle Applegate WA states that both of these soil types are stable and that landsliding is rare for these soils (USDI 1995b, pg 30).

CHAPTER III
AFFECTED ENVIRONMENT

A. INTRODUCTION

This chapter describes the present conditions within the proposed Ferris Bugman Project area that would be affected by the alternatives. No attempt has been made to describe every detail of every resource within the proposed project area. Only enough detail has been given to determine if any of the alternatives would cause significant impacts to the environment.

B. GENERAL DESCRIPTION OF THE PROPOSED PROJECT AREA

The proposed project area is in the Middle Applegate 5th level watershed. This watershed includes lands providing runoff draining into the Applegate River from below the confluence with the Little Applegate River to above the confluence with Williams Creek.

A more detailed description of the land areas and resources in the Medford District is presented in Chapter 3 of the Final Medford District Proposed Resource Management Plan/Environmental Impact Statement (USDI 1995a, pp. 3-1 through 3-122). Descriptions can also be found in the three AMA assessments (Health, Aquatic, Social), and the *Middle Applegate Watershed Analysis* (USDI 1995b).

C. HYDROLOGY, RIPARIAN RESERVES AND FISHERIES

Analysis Area

Table 1: Drainage Area Description *(same as Appendix H Table H-1).*

Drainage Area Number	Drainage Area Name	Drainage Area Description	Drainage Area (Acres) [1]	Drainage Area acres within Project Area [1]	BLM acres within Project Area[1]
AM 0327 AM 0330	Applegate River and unnamed tributaries	All lands draining into the Applegate River below Keeler Creek and above Humbug Creek	1,786	806	282
AM 0333	Humbug Creek	All lands draining into Humbug Creek	7,166	7,150	4,849
AM 0336	Applegate River and unnamed tributaries	All lands draining into the Applegate River below Humbug Creek and above Thompson Creek	895	659	327
AM 0503	Applegate River and unnamed tributaries	All lands draining into the Applegate River below Thompson Creek and above Ferris Gulch	1,990	1,990	444
AM 0506	Ferris Gulch	All lands draining into Ferris Gulch	1,751	1,751	1,234
AM 0509	Applegate River and unnamed tributaries	All lands draining into the Applegate River below Ferris Gulch and above Slagle Creek	3,413	3,289	1,039
AM 0512	Slagle Creek	All lands draining into Slagle Creek	3,862	3,862	1,910
TOTALS			20,863	19,507	10,085

1/ Slight differences in acreage from those cited elsewhere in the document are the result of source map variation and rounding error introduced by analyzing at different spatial scales.

The *Middle Applegate Watershed Analysis* (USDI 1995b) provides a general description of geomorphology,

hydrology, water quality, stream channels, riparian vegetation, and fisheries for the project area.

For purposes of analyzing the affected environment and the proposed project, the project area is divided into seven drainage areas. The Applegate River flows through the middle of the project area. Major 7th level drainages (*Table 1*) in the project area include Humbug Creek, Slagle Creek, and Ferris Gulch, all tributaries to the Applegate River. For this analysis, the small 7th level drainage areas AM0327 and AM0330 have been combined.

Precipitation Regime
Average annual precipitation in the Ferris Bugman project area ranges from approximately 25 to 32 inches. Elevations in the project area range from 1,170 feet near the mouth of Slagle Creek to 4,494 feet on Mt. Isabelle. Precipitation predominately falls between the months of November and March. Summer months are typically very dry. Rain is the predominate precipitation in most of the project area.

Three percent of the Ferris Bugman project area has elevations ranging from 3,500 feet to 4,494 feet (USGS 7.5 minute quad data) and is referred to as either the rain-on-snow zone or transient snow zone. The snow level in this zone fluctuates throughout the winter in response to alternating warm and cold fronts. A heavy rain falling on an existing snowpack can result in flooding. This effect is minimal in the Middle Applegate Watershed due to the low percentage of land in the transient snow zone (Lindell 1995). No transient snow zone analysis is included for this project, as the transient snow zone acreage within the project area is far below thresholds at which this becomes a concern. See *Appendix H* for further discussion.

Streamflow & Groundwater
Moderate to high streamflows usually occur between mid-November and April, with runoff peaking in February and March. The largest major flood flows in smaller tributaries probably occur in response to rare isolated major thunderstorms rather than in broader-scale winter flood events, although this has not been proven to be the case. The lowest streamflows generally occur in August and September. Streamflows in the Applegate River through the project area are partially regulated by Applegate Dam, as discussed in the Middle Applegate Watershed Analysis (USDI 1995b). The dam has moderated both high and low flows in the mainstem Applegate River, which now has fewer and smaller peak flows and fewer extreme low flow conditions. Many of the other streams in the project area are dry in late summer. Over-allocation and over-use of water through valid water rights and other water withdrawals likely place domestic wells and other groundwater resources at significant risk of going dry in late summer, especially in drought years.

Surface water in the proposed Ferris Bugman project area includes streams, springs, wetlands, reservoirs, and ditches. Streams in the project area are classified as perennial, intermittent with seasonal flow, intermittent with ephemeral flow, and dry draws with ephemeral flow. Streams categorized as perennial or intermittent on federal lands are required to have Riparian Reserves as defined in the Northwest Forest Plan. Dry draws do not meet the Northwest Forest Plan definition for streams needing Riparian Reserves. Streams on private forest lands are managed according to the Oregon Forest Practices Act.

Further information on the miles of each type of stream on BLM administered lands within the project area is shown in Table H-3 in *Appendix H*.

Deposition from prehistoric upland landslides as well as accumulation of rocks, soil, and vegetation raveling down and accumulating in draw and valley bottoms ("colluvium") has filled some stream and valley bottoms to a significant depth, and provides a groundwater storage source in an area that otherwise geologically stores very little groundwater. These areas often provide the source for the springs that feed many of the streams and provide domestic water for some residences in the project area. Springs/seeps were identified on federal lands throughout the project area. For more discussion of these areas, see Appendix H.

Upland Conditions Affecting Streamflow
Upland disturbances (private and public land) involving vegetation removal or soil compaction have the potential to affect the streamflow regime. Past road building, timber harvest, and agricultural land clearing have the potential to alter hydrologic processes (infiltration, interception, and evapotranspiration) in the project area. Changes to hydrologic function can result in increased magnitude and frequency of peak flows, which in turn can cause accelerated streambank erosion, scouring and deposition of stream beds, and increased sediment transport.

Unnaturally high vegetation densities are a negative long-term impact largely brought on by historic fire exclusion policies. High vegetation densities may be creating unnatural short-term stability in many headwater stream channels. This can lead to decreasing annual sediment transport in the channel, increasing the probability of channel "sluice-outs" in the long-term as storage of large quantities of sediment in these channels increases.

In the uplands, shrub communities and woodlands have become very dense. Grass and other ground cover have been greatly reduced. Therefore, fine sediment delivery to stream channels is increased due to overland flow during intense rain events. One such event occurred in Humbug Creek during a thunderstorm on June 7, 1998 with large quantities of sediment being washed into stream channels from overland flow. Culverts plugged, roads flooded, and water rose to the underside of the Humbug Creek bridge on Highway 238. Based on observation of material moved by this event, flows in many of the streams in the Humbug Creek drainage were much higher than those in the 1997 flood a year earlier, and observations indicated significant overland flow of water on hillsides–a rare even in Southwest Oregon.

Modification of the sediment-delivery regime from the headwater streams combined with major modification of valley-bottom stream channels has allowed many low gradient streams in the valley bottoms to become net exporters of sediment, leading to channel downcutting (entrenchment). These valley-bottom streams have been straightened and confined by development, severely altering the ability of these streams to move fine sediments out of the channel onto banks and floodplains during high flow events or to leave the "clean" gravels (free of fine sediment) needed by fish and other aquatic critters in the stream. Entrenched streams (Rosgen "G"-type streams, discussed in *Stream Morphology / Stream Channels*, below) are extremely susceptible to inputs of sediment from adjacent land uses and roads that route sediment directly to streams. More discussion of current impacts to the timing, volume, rate, and character of sediment input, storage, and transport is included in *Appendix H*.

Roads
Road densities are very high in the Middle Applegate Watershed. The Hydrology Report completed for the Middle Applegate Watershed Analysis (Lindell 1995, pg. 15) indicated average road density of 4.1 miles per square mile across the Watershed. For fish-bearing streams (most of which are outside the Ferris Bugman project area) in the Middle Applegate Watershed, road densities within valley-bottom riparian habitat areas average 12.4 miles of road per square mile (USDI 1995b, pg.60). The Middle Applegate Watershed Analysis Hydrology Report indicated an average of 38.4 road/stream crossings per square mile in the Middle Applegate Watershed (Lindell 1995, pg. 15). Road effects are a major concern related to cumulative effects because they do not mimic any process that would be expected to occur in the watershed under natural conditions. Because of this, it is critical that any proposed projects have a high probability of improving degraded hydrologic conditions related to roads, rather than just maintaining the existing condition.

Many factors influence how much effect any given road has on the hydrology of an area. Roads of similar size and type may have dramatically different effects. Location on the landscape is also a major factor, with roads in stable locations and high on ridges much less likely to negatively affect streams than roads located on unstable ground, crossing the stream or right next to the stream. Further discussion of roads is included in *Appendix H*.

For hydrologic analysis of the Ferris Bugman project, "miles of road disturbance" (*Table 2*) refers to the estimated

miles of roads in any condition that may have a detectable effect on the hydrologic/aquatic environment. This includes open, closed, decommissioned, abandoned or obliterated roads, roads passable by passenger cars and roads, or trails used by 4-wheel drive passenger car- or truck-sized vehicles ("jeep trails"). The mileage figures do not generally include smaller trails passable only by motorcyles, ATVs or other small-sized off-road vehicles. It is assumed that with increasing road density, there are also increased densities of these smaller trails with their associated impacts. The road mileage figures are higher here than those stated elsewhere in the document, because the area analyzed takes in the entire 7th level hydrologic unit (drainage) rather than just the area within the project boundary. The figures are also higher because they include rough estimates of the numbers of very small, old, or abandoned roads that may not be readily detectable off of air photos. This was necessary to adequately analyze impacts to watershed resources.

The road density figures were calculated for entire drainage areas, regardless of ownership. In general, road densities are much lower on BLM administered lands than on other ownerships. While existing road density across all ownerships in the project area averages approximately 6 miles per square mile, the road density on BLM administered lands within the drainage areas analyzed for the Ferris Bugman Project is less than 1.5 miles per square mile (23 miles of road across 15.8 square miles).

Table 2: Ferris Bugman Project Area Road Density *(same as Appendix H Table H-5)*.

Drainage Area Number[1] (see Table H-1)	Existing Miles of Road Disturbance [2]								
	Active Roads					Inactive Roads		Total	Total per square mile
	Unknown Roads	BLM Open Roads	BLM Closed Roads	Total Active Roads	Total Active roads per square mile	BLM Decommissioned Roads	BLM Obliterated Roads		
AM 0327 AM 0330	24.3	0.3	0.4	**25.0**	**8.9**	0.0	0.0	**25.0**	**8.9**
AM 0333	46.6	5.2	1.1	**52.7**	**4.7**	0.0	0.0	**52.7**	**4.7**
AM 0336	7.9	0.0	0.0	**7.9**	**5.7**	0.0	0.0	**7.9**	**5.7**
AM 0503	18.6	0.1	0.0	**18.7**	**6.0**	0.0	0.0	**18.7**	**6.0**
AM 0506	12.0	8.0	2.7	**22.7**	**8.3**	0.4	0.3	**23.4**	**8.6**
AM 0509	45.6	1.9	0.7	**48.2**	**9.0**	0.0	0.0	**48.2**	**9.0**
AM 0512	20.1	0.6	1.3	**22.0**	**3.6**	0.0	0.0	**22.0**	**3.6**
TOTAL	**174.8**	**16.1**	**6.2**	**197.1**	**6.0**	**0.4**	**0.3**	**197.8**	**6.1**

1/ Drainage areas: **AM0327**/**AM0330**-Applegate River below Keeler Creek, above Humbug Creek; **AM0333**-Humbug Creek; **AM0336**-Applegate River below Humbug Creek, above Thompson Creek; **AM0503**-Applegate River below Thompson Creek, above Ferris Gulch; **AM0506**-Ferris Gulch; **AM0509**-Applegate River below Ferris Gulch, above Slagle Creek; **AM0512**-Slagle Creek. See Table H-1 (Appendix H) for details.
2/ Slight differences in mileage from those cited elsewhere in the document are the result of source map variation and rounding error introduced by analyzing at different spatial scales. Cumulative differences are generally less than 0.1 mile. An additional 0.7 mile of the so-called Wellington Butte Road that is outside the project boundary and analyzed drainage areas is not included here.
3/ Rounding visible values to tenths resulted in some values that appear to be off by a tenth, but are in fact correct.

Road stream crossings affect riparian vegetation as well as water quality and channel morphology. Riparian vegetation removal at road stream crossings reduces riparian habitat and stream shading. Road stream crossings can be a major source of sediment delivery to stream channels. Existing numbers of road stream crossings calculated from the BLM GIS transportation theme for the project area are shown in Table H-6 of *Appendix H*.

Risk of Adverse Watershed Cumulative Effects from Roads and past Timber Harvest

The Forest Service developed a process for assessing upland watershed condition and the relative risk of adverse cumulative effects from proposed management actions (USDA 1993). This process uses two primary indicators to assess the current watershed condition as it relates to hydrologic functions: road density and the percent of the drainage area that has forested stands less than 30 years old. A watershed risk rating for the existing condition in the project area is determined from these two indicators (*Table H-7, Appendix H*).

Based on current road densities and acres in stands less than 30 years of age, the watershed risk rating is "high" for all drainage areas except Slagle Creek (AM0512), which currently has a "moderate risk" rating. High road densities are the primary factor leading to the high rankings, except in Ferris Gulch, which has both high road density and a high percentage of stands less than 30 years of age.

The Watershed Risk Rating is not a measure of the cumulative effects related to a project; rather, it is an indicator of the possible sensitivity of the watershed to additional disturbance. In the case of the Ferris Bugman Project, the Watershed Risk Rating indicates that it is extremely important that the proposed project result in reduced risk of degradation to the watershed rather than increasing that risk. In assessing the level of risk in the proposed project, current conditions must be weighed against proposed and possible future changes, both human-caused and natural. Factors include (but are not limited to) such things as current vegetation conditions relative to those expected under the natural fire regime of the area, impact of existing roads (many built long before ecological impact played into road design) and road conditions, location of roads on the landscape, roadwork and vegetation mangement proposed under the project, and reasonably foreseeable future actions/events such as timber harvest or wildfire. Discussion of these factors is included throughout the EA, as well as in *Appendix H*.

Risk of Adverse Watershed Impacts from past Fire Exclusion Policies and Vegetation Management Practices

Changes in vegetation structure and density due to the combined effect of fire suppression policies, logging, and residential and agricultural clearing probably represent the most significant impact to watershed conditions in the Middle Applegate. The hydrology of the area is probably only in the early stages of dramatic change that will continue to occur unless significant change in vegetation management is implemented across the landscape by agencies and landowners.

Within the Watershed, canopy closure and the associated reduction in peak flows are probably still much greater than recent prehistoric conditions. The large increases in canopy closure due to fire exclusion are probably greater than the decreases brought on by harvest practices, agricultural and residential clearing, and recent wildfires. The negative effects on peak flows and hydrologic function due to road-related disturbance probably offsets the reductions occurring from high vegetation densities. Canopy closures are likely much higher today than in the early 1900's, when the watershed was still experiencing the combined effects of recent prehistoric vegetation management utilizing fire by Native Americans, landscape burning and hydraulic mining impacts resulting from the quest for precious metals, intensive grazing practices, and initial clearing of areas for agricultural development.

Stream Morphology / Stream Channels

On BLM administered lands within the project area there are three moderate-sized tributaries to the Applegate River: Humbug Creek, Slagle Creek, and Ferris Gulch. Apart from the Applegate River, perennial streams on BLM administered lands in the project area have bankfull (1-2 year return interval flow event) widths of 1.4-9.2 feet, bankfull depths of 0.1-1.0 feet, and flood-prone area widths (the width in common return interval floods, i.e. 20-30 year events) of 6-17 feet. Intermittent streams on BLM administered land in the project area have bankfull widths from 0.5-8.0 feet, bankfull depths of 0.1-1.0 feet, and floodprone area widths of 1-15 feet. More specific details are in *Appendix H*.

Rosgen's (1994) stream classification system is used to categorize channel morphology characteristics. Stream type categories are based on stream gradients, sinuosities, valley form, entrenchment, and confinement (Rosgen

1994). Streams on federal lands in the project area are mainly classified as Rosgen types A and B. On federal lands, most streams are located in the upper reaches of drainage areas and are classified as type A streams. Type A streams are high gradient, entrenched, step/pool streams and highly stable, although accumulated colluvial layers within the channels may be unstable. Streams on some of the less-steep areas on federal lands are type B streams: moderately entrenched and riffle-dominated with infrequently spaced pools. They have stable stream banks and landforms that are narrow, gently sloping valleys.

On private land, the lower reaches of both Ferris Gulch and Slagle Creek and the main stem of Humbug Creek between the Left Fork and Kane Creek (Humbug Creek tributary) are classified as Rosgen type G (MAWA 1995). Type G streams are entrenched gullies with step/pool morphology. They have moderate slopes and low width-to-depth ratios. They are unstable, with grade control problems and high bank erosion rates. The instability that changed these streams from the stable type B streams likely present naturally to the type G streams was probably triggered by a combination of impacts from on-site mining, removal of streamside vegetation and instream large wood, channel straightening and channel confinement (see discussion under *Upland Conditions Affecting Streamflow*, *Appendix H*).

The relatively steep locations of many of the headwater streams means that over time, flood events or debris torrents are likely to transport large key pieces of wood to the downstream aquatic system. Key pieces of large wood in these types of stream systems tend to promote formation of large, stable debris jams, which over time capture large, deep, relatively stable colluvial deposits. These areas tend to store large amounts of ground water, and serve as "sediment filters" through which water can percolate. These natural structures have likely declined in frequency in many streams in the Applegate area due to declining inputs of large key pieces of wood, probably due to a combination of historic removal of large wood from streams, harvest of the large trees likely to fall into streams, and suppressed growth of future large trees due to overly dense stands.

Water quality
By state law, water quality is to be managed to protect recognized beneficial uses in the Middle Applegate Watershed including domestic water supply, municipal water supply, industrial water supply, irrigation, livestock watering, cold water fish, other aquatic life, wildlife, recreation, aesthetics, and power development (ODEQ 1992 in USDI 1995b, pg. 56). State standards are designed to protect the most sensitive beneficial use within a waterbody. The key water quality criteria established to protect the most sensitive of these designated beneficial uses are: flow modifications, temperature, dissolved oxygen, pH, bacteria/pathogens, turbidity, sedimentation, and habitat modifications. Of these, stream temperature has been identified by the Oregon Department of Environmental Quality (DEQ) as a problem within the project area.

The portion of the Applegate River in the project area is on the DEQ 1998 list of water quality limited streams, also known as the 303(d) list from Section 303(d) of the 1972 Federal Clean Water Act (CWA). The River is listed for high summer stream temperatures and flow modification. Other streams within the project area are not listed for any 303(d) list concerns (data from ODEQ website http://waterquality.deq.state.or.us). With flow regulation in the river by Applegate Dam beginning in 1981, summer flows are higher and stream temperatures are lower than prior to the dam (MAWA 1995, pg. 58). Summertime river temperatures are still well above the 64° Fahrenheit (F.) standard established by DEQ. Although actions proposed in this EA are not directly adjacent to the river itself, and the total flows out of project area tributaries represent only a small percentage of the total flow in the River at this location, the cumulative effect of water quality in these type of streams throughout the Applegate Subbasin (the entire Applegate River drainage) is a very important factor in the water quality of the river.

Stream temperature has been monitored at several locations within the project area. Temperatures on all monitored streams on federal lands within the project area are below the 64° F. DEQ standard. Summer flows originating out of this area are very low, with much of the flow subsurface. Most of the perennial portions of project area streams have heavy riparian cover, further maintaining cool stream temperatures. Further stream temperature data and

discussion is included in *Appendix H*.

Large portions of the project area have not had a major fire in more than 70 years, a much longer time period than the natural fire frequency for much of this area (see discussion under *Dense Stands/Forest Vigor* and *Fire and Fuels* in this chapter). Large, severe fires resulting from overly-dense vegetation can lead to large inputs of sediment during post-fire landslides and floods. There has recently been a trend to larger more intense fires in similar areas, and the conditions contributing to this trend appear likely to continue (see discussion in *Fire and Fuels* later in this chapter). Sediment input occurring from flood events generally does not have a major negative impact on properly functioning portions of the downstream aquatic system, as fine sediments are typically pumped out of stream channels onto banks and floodplain areas. Examples of areas at risk for degradation in these types of events are streams that have been confined, channelized, straightened, or otherwise disconnected from their floodplains and unable to properly move and store sediment (see discussion under *Upland Conditions Affecting Streamflow*, Appendix H.); such streams can suffer further degradation due to severe fire effects. Areas along valley-bottom streams where the density and age/size structure of streamside tree and plant communities have been reduced or removed completely and where streams have been confined or straightened have increased susceptibility to adverse effects from flood events. This includes effects such as severe bank erosion, increased widths and decreased depths of stream channels, and associated degradation of water quality. Many of the lower portions of Slagle Creek, Humbug Creek, and Ferris Gulch, as well as the Applegate River are currently at risk for this reason.

Riparian areas on Public Land

Riparian area vegetation species diversity within the project area is good, with a broad range of riparian species present along perennial and seasonal streams. Ephemeral streams within the project area generally are comprised of the same plant communities as the surrounding uplands. The widest riparian areas on BLM administered lands are along the perennial streams, with total widths ranging from 8-35' (width from one side of the riparian area to the other, including the stream), except for two reaches along the Applegate River which have riparian area widths of 150-300 feet. Long duration intermittent streams (seasonal streams) on BLM administered lands have riparian area widths ranging from 0-50 feet, with the majority in the 10-15 foot wide range. Short duration intermittent streams (ephemeral streams) on BLM administered lands have riparian area widths ranging from 0-30 feet, with the majority 10 feet and under. Dry draws on BLM administered lands have no riparian vegetation except where springs are present; otherwise, vegetation is essentially indistinguishable from the surrounding uplands.

Riparian conditions have probably been affected by fire suppression policies and past timber management activities that did not mimic natural processes. Given the natural fire frequency in this area, many low-severity fire events have likely been suppressed over the past century, leading to riparian vegetation densities greater than would be expected under the fire regime for this area (see *Fire and Fuels* discussion in this chapter). Exclusion of low-intensity fire coupled with removal of the largest size classes of trees have lead to some of the riparian areas being composed of dense, suppressed small-diameter vegetation (MAWA 1995, pg.61) and high mortality rates for the large, more fire-resistant trees.

Hardwoods present in most riparian areas are species with roots that often survive wildfire. Crowns and trunks can be destroyed by fire, but these hardwoods quickly resprout from the roots, helping maintain long-term slope stability. Conifers with tops killed by fire do not resprout; as the roots rot away, slopes can sometimes become unstable until the next generation of trees develop large roots. Conifer roots often are very shallow, while hardwood roots tend to be somewhat deeper, an added stabilizing factor in fire-adapted landscapes. Riparian areas and contributing uplands where hardwood stands are gradually being replaced by conifer species due to fire exclusion are probably at greater risk of soil instability and associated downstream sediment impacts following intense wildfire than was probably the case with more frequent fire. Once the trees fall into stream channels, wood from conifers takes much longer to rot away than wood from hardwoods. In a fire-adapted landscape, since hardwoods are important for slope and soil stability and large conifer wood provides long-term instream structure

and associated sediment storage, long-term proper functioning of downstream riparian areas is critically dependent on both hardwoods and conifers.

Riparian Area Functioning Condition Assessment
Over 38 miles of riparian areas on BLM-managed lands within the project area were assessed on-site for Proper Functioning Condition (PFC), which is a qualitative method for assessing the condition of riparian-wetland areas (USDI 1998, USDI 1999). The PFC assessment considers hydrology, vegetation, and erosion/deposition attributes and processes to assess the riparian condition. The assessment places riparian areas into one of four categories: proper functioning, functional-at risk, nonfunctional, and unknown. The functional-at risk category is further defined by a trend: upward, downward, or not apparent.

The majority of riparian areas on BLM-managed lands within the project area are rated as being in proper functioning condition or functional-at risk with an upward trend. However, drainage areas with high numbers of functioning condition problems included Humbug Creek (39 percent of streams not in the "proper functioning" or "functional-at risk trend upward" categories), Ferris Gulch (35 percent of streams not in the "proper functioning" or "functional-at risk trend upward" categories), and the drainage along the Applegate River downstream of Ferris Gulch and upstream of Slagle Creek (59 percent of streams not in the "proper functioning" or "functional-at risk trend upward" categories). The high percentage of streams in the Slagle Creek drainage on a downward trend (20 %) is also a concern. Primary conditions leading to the negative ratings in these drainages were lack of instream large wood, lack of existing large trees along the stream which can become instream large wood, old roads in the riparian area, historic hydraulic mining impacts, and severe downcutting/channel incisement, probably related to the lack of large wood. In the drainage area along the Applegate River extending from the mouth of Ferris Gulch to the mouth of Slagle Creek, riparian overgrazing was identified as an additional negative factor. Appendix H Table H-8 and expanded discussion in *Appendix H* further detail the PFC information.

Riparian Reserves
Northwest Forest Plan Riparian Reserves are located on federal lands throughout the project area. Riparian Reserves do not apply to non-federal lands. The locations of Riparian Reserves were determined from on-the-ground surveys of every stream and draw on federal lands within the project area. Riparian Reserve widths were determined site-specifically using the guidelines on page C-30 and 31 of the Northwest Forest Plan Standards and Guidelines. Further discussion of Riparian Reserves is included in *Appendix H.*

General Description of Riparian Reserve Condition on Public Lands
Humbug Creek: South-facing Humbug Creek drainage burned in the major fire of 1931. Many intermittent streams in the Humbug Creek drainage, have riparian vegetation characterized by extremely thick, dense, second growth Douglas-fir of less than 6 inches in diameter, or manzanita and buck brush. There is very little undergrowth or a mid-level canopy layer due to the overgrown condition of the primary vegetation. There is also very little Course Woody Material (CWM), which may be a result of past forest fires, past gold-mining, or a combination of the two. Riparian areas (see Glossary) tend to be very narrow: 20 feet on each side of the stream is common[1].

Ferris Gulch: The stream in Ferris Gulch has a large amount of its mainstem on public land. Unfortunately, the riparian areas along mainstem Ferris Gulch – oak woodlands on the south and mixed conifer woodlands on the north– have been invaded by weeds, roads and OHV trails run along the stream. Riparian areas along the intermittent streams that feed Ferris Gulch are of two types. The east-facing streams have timbered reserves. The west-facing streams flow through overgrown oak woodlands and scraggly conifer stands. These small streams have very little to no riparian vegetation and narrow (less than 25 feet on each side) riparian areas.

[1] Based on BLM stream survey data covering most perennial and intermittent streams in the project area.

Slagle Creek: In Slagle Creek, most of the project area is within forested areas. The intermittent streams in these forested areas tend to be V-shaped, with narrow riparian areas. Generally, only perennial streams have adequate vegetation understories, possibly due to minimal impacts from historical activities. Although the closed upper canopy suppresses secondary vegetation layering, it keeps the riparian areas moist in a few of the tributaries.

For additional information on riparian condition, see *Appendix R*, as well as *Appendix H*.

Fish and Fish Habitat

On June 18, 1997, the National Marine Fisheries Service (NMFS) listed southern Oregon/Northern California (SONC) coho salmon as "Threatened" under the Endangered species act [FR 62(17:33038]. On May 5, 1999, NMFS designated "Critical Habitat" for SONC coho [FR64(86):24049]. All of the streams in the project area lie within the designated Critical Habitat area for SONC coho. However, within the project area, coho only spawn and rear in the Applegate River. The closest harvest unit in the Ferris Bugman project is approximately one-half (½) mile from the Applegate River; separated hydrologically from the river by an irrigation ditch, flat agricultural land, and Hwy. 238. The farthest harvest unit is approximately 6 miles from the river.

None of the commercial harvest units are adjacent to a fish-bearing stream reach. Only one pre-commercial thinning unit meets up with a Riparian Reserve along the fish-bearing section of Balls Branch (Humbug drainage). In fact, over 80% of the Riparian Reserves protect intermittent streams, many of which are short duration due to the south aspect, soils, and vegetation types found in the area. See *Appendix R* for more information.

Table 3: Stream miles on *public land* within the Ferris Bugman Project analysis area. Fish-bearing miles are approximate. Non-fish bearing miles are calculated from current BLM Geographic Information System layers (May 2002), which are updated with verified fish data from ARWC surveys, ODFW surveys, BLM on-the-ground surveys, and similar sources. These data have been corrected from the Draft Ferris-Bugman EA, and this new information provided to NMFS. Also see table footnote.

Drainage (see *Table 1*)	**Fish-bearing**	**Non-fish bearing**		
	All stream types	**Perennial**	**Intermittent**	**Total**
Humbug Creek (AM 0333)	0.3[a]	3.9	19.6	23.8
Ferris Gulch (AM 0506)	0.0	1.7	4.6	6.3
Slagle Creek (AM 0512)	0.4[b]	0.9	11.1	12.4[b]
Applegate frontal (AM0509)	0.0	0.5	4.8	5.3
Applegate frontal (AM0503)	0.0	0.0	1.1	1.1
Applegate frontal (AM0327/AM0330)	0.0	0.0	1.4	1.4
Applegate frontal (AM0336)	0.0	0.0	1.2	1.2
Total	**0.7** [b]	**7.0**	**43.8**	**51.5** [b]

a - The fish-bearing stream miles on BLM in the Humbug Creek drainage are in Balls Branch. This mileage estimate has been corrected from the Draft Ferris-Bugman E.A. Information from Applegate River Watershed Council surveys, August, 1999 and extrapolated to likely end of fish habitat.

b- This is a correction from the Draft Ferris-Bugman EA. Riparian Reserves on BLM protect 0.4 miles of fish-bearing stream located on private; although included in the totals for public land, here, 0.4 miles of this total is not actually on public land.

D. SOILS

The soils in the project area formed from material weathered from igneous, metamorphic, and granitic rock on hillslopes and alluvial fans. The topography ranges from 5 percent to near 80 percent slopes. The major soils series identified in the project area are Caris-Offenbacher, Vannoy, Vannoy-Voorhies, McMullin-Rock, Tallowbox, Ruch, Manita, and Schefflein. The Manita soils have montmorillonitic minerology which causes these soils to have high shrink-swell potential and are subject to severe compaction. The Caris-Offenbacher, McMullin-Rock, and Tallowbox soils have high rock content and/or are shallow in depth which limits moisture holding capacity. Additionally, Tallowbox and Schefflein formed from granitic parent material. The following tables list the soil characteristics of each respective soil series. A map showing the location of these soils on the landscape is on file at the Medford BLM office. In *Appendix S* are tables listing, for each soil type: soil characteristics, site index, productivity class, concerns, and hazards.

Tractor yarding would be used on approximately 7% of the project area on all or portions of 11 units.

Skyline yarding would be used on approximately 33% of the project area on all or part of 20 units.

Helicopter yarding would be used on approximately 60% of the project area on all or part of 47 units.

New Road Construction The P-line (proposed road line) for the proposed extension of road 37-4-22.0 and both of its spurs was surveyed for hydrologic, soils and slope stability concerns. This P-line is positioned on the upper third of all slopes it traverses, often it is on the ridge top. At P-line station number 249+49 (24,949 feet from the beginning of proposed new construction) granitic rock was encountered on the P-line and continued to be present until the end of the proposed road (266+00). Between these two points depth to bedrock is less than is typically found on granitic soils of the area and rock outcrops are common; due to these features this soil type might better be classified as the McMullin-Rock outcrop series.

In conversation with the authors of soil input to both the Middle Applegate and Little Applegate Watershed analyses, agreement was reached that granitic rocks as found in the Applegate Watershed are not as erosive as those found in Evans Creek and the Mt Ashland Batholith. Possible reasons for this are that the Applegate rocks have undergone metamorphic conditions and Mt Ashland and Evans Creek have not been subjected to these pressures and temperatures.

The SE 1/4 of section 4 is privately owned and was extensively tractor logged decades ago. Portions of several cat roads in the mid-to-upper portions of the ridge were walked. Despite using road-building techniques that side cast excavated material, both fill and side slopes were stable.

Roads and Soils
In Ferris Gulch soil compaction is more extensive than in other areas of the Middle Applegate (USDI 1995b, pg 32). Road-induced and OHV-induced erosion has been observed in the Ferris Gulch area (USDI 1995b, pg 32).

Roads can affect geomorphic processes by four primary mechanisms:

(1) accelerating erosion from the road surface and prism itself by both mass and surface erosion processes;
(2) directly affecting channel structure and geometry;
(3) altering surface flowpaths, leading to possible diversion or extension of channels onto previously unchannelized portions of the landscape; and
(4) causing interactions among water, sediment, and woody debris at road-stream crossings.

Roads in midslope and ridgetop positions may affect the drainage network by initiating new channels or extending the existing drainage network. Roads may decrease the critical source area required to initiate headwater streams by concentrating runoff along an impervious surface. However, concentrated road runoff channeled in roadside ditches may extend the channel network by eroding gullies or intermittent channels on hillslopes and by linking road segments to small tributary streams.

Increased sediment delivery to streams after road building has been well-documented in the research literature in the Pacific Northwest and Idaho (Bilby et. al., 1989, Donald et. al., 1996, Megahan and Kidd 1972, Reid and Dunne 1984, Rothacher 1971, Sullivan and Duncan 1981). The largest sediment losses occur during road building

and before exposed soils are protected by re-vegetation, surfacing, or erosion control materials. After construction, surface erosion from road surfaces, cutbanks, and ditches represents the dominant source of road-related sediment input to streams. Ridge top and near-ridge top roads have the least potential for delivery of sediment to stream, due to trapping of sediment by vegetation.

Erosion Hazard relates to the ease of detachment and movement of soil and rock particles– it is not meant to imply that this material has entered the aquatic environment, but rather the colluvial environment where it could remain for years to millennia. Almost all soils on hillslopes in the Middle Applegate Watershed form in colluvium.

Recent studies on the Applegate AMA indicate that prescriptions that promote the development of late-successional species and structure could help to decrease bulk densities and increase soil organic matter over time (Amaranthus, 1997, PNW-RP-504, page 5).

Fuels and Soils

Almost a century of fire exclusion has occurred in this area; consequently, "natural" conditions no longer exist. Fuel loading is greater and duff/litter layers are often greater than would naturally occur. Given the natural fire frequency in this area, many low-severity fire events have likely been suppressed over the past century. Long periods of protection from fire are associated with fuel buildup (Agee, 1993), which leads to litter depths greater than would be expected under a more natural fire regime. Consequently, an uncontrolled natural burn event could be of such intensity so as to severely increase erosion and sedimentation, and also severely set back the community of microorganisms. For this reason, proposed fuel treatments are considered to have a net positive influence on soil resources.

Additionally, site productivity can be enhanced by reducing the potential for hot, uncontrolled wildfires through: fuel reduction treatments, encouraging the building of soil organic matter, promoting hardwood species, maintaining an adequate duff and litter layer, and encouraging development of large woody debris (Amaranthus, ibid.).

E. DENSE STANDS/FOREST VIGOR

The present day landscape pattern of the vegetation in the Ferris Bugman project area is a result of topography, fires of the 1800 and 1900s, timber harvesting, and agricultural/residential land development. There is a natural diversity of vegetation condition classes within stands and between stands whose boundaries are generally dictated by slope, aspect and past disturbance. Aspect is an important determinant in vegetation changes. Ridges with westerly to southerly aspects have severe growing conditions with shrubs and grasses dominating these sites. As a result, the majority of the timber stands are separated by grasslands, shrublands or oak woodlands. These influences create a coarse-grained pattern across the landscape with a mosaic pattern of different vegetation types and seral stages.

In the Appleseed project area, 24,425 acres are federally-owned, 10,085 acres of which are in the Ferris Bugman project area. The Ferris Bugman project area is presently composed of the following vegetation types: grassland, 249 acres; shrubland, 1,292 acres; hardwood/woodland, 3,638 acres; seedlings/saplings (0 to 4.9 inches DBH), 218 acres; small conifer timber (5 to 11 inches DBH), 822 acres; and large conifer (11 to 21 inches DBH) and mature timber, 3,484 acres.

In the project area, many of the commercial forest stands originated between 1864 and 1934 following large and small-scale fires. Most of the forest stands became established within 10 years after a fire, although the harsher sites may have taken 30 to 40 years to become forested. Because these forests are single-species dominated, individual timber stands now tend to have many trees of the same age class, almost equal in height, with few older trees scattered throughout. The majority of the trees in the project area are between 65 and 140 years old. However, there are 130 to 200 year old trees in fewer numbers. The oldest trees found were 302 and 345 years old. Age classes greater than 170 are the least frequently found. These older stands are in the understory reinitiation stage of forest development and vertical stand structure is diverse .

Most stands, 100 years old and less, are still in the stem exclusion stage. These stands are characterized by a closed canopy and high stocking levels (sometimes more hardwoods than conifers) with many suppressed trees resulting in poor individual tree vigor. The average canopy closure for the Appleseed project area is 87% and ranges from 50 to 99%. Some forest stands have been selectively logged, commercially thinned or have suffered mortality from natural disturbance. These stands tend to be more diverse in species composition and vertical structure.

There are three tree series in the project area: Douglas-fir, ponderosa pine, and white oak. The PSME (Douglas-fir)/RHDI (poison oak) and PSME/RHDI-BEPI (Piper's Oregongrape) plant associations are most prevalent at lower elevations and on dry ridges. As the elevation increases and rainfall is more abundant, or the aspect is more conducive to cooler temperatures, plant associations most often found include PSME-PIPO (ponderosa pine), and PSME/BENE (dwarf Oregongrape). Small areas of PIPO-QUKE (California black oak) are present. The PIPO-PSME association is slightly warmer and wetter than the PIPO-QUKE association. Poison oak is the only commonly occurring shrub (USDA, 1996). The white oak series (QUGA) occurs near the valley floor at low elevations. The series tends to be found in areas of shallow soils, and hot, dry microclimates. Two oak associations may be found: QUGA-PSME/RHDI and QUGA/CYEC (hedgehog dogtail).

Subtle changes in species composition and stand structure are occurring over the landscape. Many trees with old-growth characteristics are dying as a result of increased competition with second growth trees for limited resources. Douglas-fir, the climax species for the majority of the forested area, is replacing ponderosa pine, sugar pine and incense cedar because of its more shade-tolerant nature. Douglas-fir is encroaching upon the edges of the oak woodlands, and mortality of Douglas-fir along these edges has been noticeable during the last few years. Whiteleaf manzanita and ceanothus species are migrating into the oak woodlands and replacing the oaks, pines, and native grass species. In the mid-size vegetation condition class, suppressed shrubs and hardwood trees beneath the dominant tree canopy layer are dying. Pacific madrone and white and black oak have dropped out of conifer stands where light and water have become limiting. Dead whiteleaf manzanita may be found in the understory of some conifer stands and is indicative of a vegetation shift from shrubs to trees. This may also indicate that whiteleaf manzanita is the species that would pioneer the site following future disturbance. Other shrub species dying out of the conifer stands include deerbrush ceanothus, creambrush oceanspray, and serviceberry.

Currently, the stocking levels of stands throughout the project area are high. This is primarily due to the lack of natural disturbance and fire suppression. Merchantable trees per acre range from 77 to 578. The overall average for the Appleseed project area is 378 merchantable trees per acre. Average decadal radial growth is 0.55 inches (BLM, unpublished data). The average relative density for the area is 0.75 and indicates that physiologically, the trees are at the point of suppression and mortality. Vegetation densities are also extremely high in the shrublands and woodlands and indicate an increased potential for fire. The average tree vigor index, as measured by leaf area index is 47. Trees with vigor indices below 30 would succumb to bark beetle attacks of relatively low intensity. Trees with vigor between 30 to 70 can withstand progressively higher attacks but are still in danger of mortality from the insect attacks. Trees with vigor between 70 to 100 can survive one or more years of relatively heavy attacks; trees with indices above 100 cannot be killed by bark beetles (Waring, 1980).

Bark beetle infestations are present in the project area. Western pine beetles *(Dendroctonus brevicomis*) are attacking the pines, while flatheaded fir borers *(Melanophila drummondi*) and Douglas-fir beetles *(Dendroctonus pseudotsugae*) are killing Douglas-fir. Drought conditions and high tree stocking levels are severely stressing the trees physiologically, enabling the beetles to enter and kill the trees.

Forest pathogens are also changing the forest stand structure and forest development pattern. *Phellinus pini* (red ring rot) is affecting Douglas-fir and ponderosa pine. The disease is most common in stressed trees. Some of the infected trees are beginning to die or are subject to stem breakage thus allowing light to reach the forest floor and the understory reinitiation stage to begin. *Phaelous schweinitzii* (brown cubical butt rot) is also present.

In the project area, the overall average amount of coarse woody material (CWM) is approximately 7.3 tons per acre. The coarse woody material stem diameters were concentrated in the 5 to 29 inch classes at the large end, and averaged 25.4 feet in length (BLM, unpublished data). Coarse woody material was most often found to be in a decomposition class 3 which is characterized by very little bark, no twigs, but a solid stem.

Noxious Weeds

Table 4: Known Noxious Weed Sites in the Ferris-Bugman project area.

Location	Unit	Weed Species
37-3W-31	Bugman #1	*Cirsium vulgare* (Bull thistle)
38-4W-1	Bugman #2	*Cirsium vulgare*
38-3W-6	Bugman #5	*Centaurea solstitialis* (Star thistle) *Cirsium vulgare*
38-4W-12	Bugman #8	*Cirsium vulgare*
38-4W-11	Bugman #9	*Cirsium vulgare*
38-3W-7	Bugman #10	*Cirsium vulgare*
38-4W-20	Ferris #5	*Centaurea solstitialis*
38-4W-20	Ferris #17	*Taeniatherum caput-medusae* (Medusa head)
37-4W-29	Slagle #1	*Cirsium vulgare*
37-4W-33	Slagle #3	*Cirsium vulgare*
37-4W-34	Slagle #8	*Cirsium vulgare*
37-4W-35	Slagle #6	*Cirsium arvense* (Canada thistle)
38-4W-2	Slagle #8	*Cirsium vulgare*
38-4W-3	Slagle #8	*Cirsium vulgare*
37-4W-33	Slagle #9	*Cirsium vulgare*
37-4W-33	Slagle #10	*Cirsium vulgare*
37-4W-33	Slagle #11	*Cirsium vulgare*
37-4W-33	Slagle #12	*Cirsium vulgare*
37-4W-33	Slagle #13	*Cirsium vulgare*
37-4W-32	Slagle #14	*Cirsium vulgare*
37-4W-32	Slagle #15	*Cirsium vulgare*
38-4W-4	Slagle #19	*Cirsium vulgare*

F. FIRE AND FUELS

Wildfire History
Fire is recognized as a key natural disturbance process throughout Southwest Oregon (Atzet and Wheeler 1982). Human-caused and lightning fires have been a source of disturbance to the landscape for thousands of years. Native Americans influenced vegetation patterns for over a thousand years by igniting fires to enhance values that were important to their culture (Pullen, 1995). Early settlers to this area used fire to improve grazing and farming and to expose rock and soil for mining. Fire has played an important role in influencing successional processes. Large fires were a common occurrence in the area based on fire scars and vegetative patterns and were of varying severities.

Climate and topography combine to create the fire regime found throughout the project area. Fire regime refers the frequency, severity and extent of fires occurring in an area (Agee 1991). Vegetation types are helpful in delineating different fire regimes. Two historic broad fire regimes within the project area were identified using vegetation types as a basis for fire regime delineation. These regimes are based on the effects from fire on the dominant vegetation.

Low-Severity Regime
The low-severity regime is characterized by vegetation types such as grasslands, shrublands, hardwoods and mixed hardwood, and pine which are similar to the Interior Valley Vegetative Zone of Franklin and Dyrness (1988). These plant communities recover rapidly from fire and are directly or indirectly dependent on fire for their continued persistence. The dominant trees within this regime are adapted to resist fire due to the thick bark they develop at a young age. A low-severity regime is characterized by nearly continual summer drought; fires are frequent (1-25 years), burn with low intensity, and are widespread.

Moderate-Severity Regime
The moderate-severity regime is associated with the Mixed Conifer Vegetative Zone of Franklin and Dyrness (1988) and is characterized by long, dry summers and high fire frequency (25-100 years). This regime is the most difficult to characterize and is often located in a transitional position between low and high elevation forests or plant communities. Fires burn with different degrees of intensity within this regime. Stand replacement fires as well as low intensity fires can occur depending on burning conditions. The overall effect of fire on the landscape in this regime is a mosaic burn.

In the early 1900s, uncontrolled fires were considered to be detrimental to forests. Suppression of all fires became a major goal of land management agencies. From the 1950s to present, suppression of all fires became efficient because of an increase in suppression forces and improved techniques. As a result of the absence of fire, there has been a build-up of unnatural fuel loadings and a change to fire-prone vegetative conditions.

Based on calculations using fire return intervals, five fire cycles have been eliminated in the southwest Oregon mixed conifer forests that occur at low elevations (Thomas and Agee 1986). Species, such as ponderosa pine and oaks, have decreased. Many stands, which were once open, are now heavily stocked with conifers and small oaks which has changed the horizontal and vertical stand structure. Surface fuels and laddering effect of fuels have increased, which has increased the threat of crown fires which were once historically rare.

Many seedling and pole size forests of the 20th century have failed to grow into old-growth forests because of the lack of natural thinning once provided by frequent fire. Frequent low intensity fires serve as a thinning mechanism, thereby, naturally regulating the density of the forests by killing unsuited and small trees. Consequently, this has slowed the process of creating old growth stands. In addition, ponderosa pine trees that thrive in fire prone environments are quickly shaded out by the more shade tolerant Douglas-fir or white fir species in the absence of fire. As a result, some late-successional forests have undergone a rapid transition from ponderosa pine stands to excessively dense true fir stands. Trees growing at lower densities, as in ponderosa pine stands, tend to be more fire-resistant and vigorous. Eventually they grow large and tall, enhancing the vertical and structural

diversity of the forest. Some populations of organisms that thrive in the more structurally diverse forests that large trees provide are becoming threatened.

Many forests developed high tree densities and produced slow-growing trees rather than faster-growing trees after abrupt fire suppression became policy in about 1900. Trees facing such intense competition often become weakened and are highly susceptible to insect epidemics and tree pathogens. Younger trees (mostly conifers) contribute to stress and mortality of mature conifers and hardwoods. High density forests burn with increased intensity because of the unnaturally high fuel levels. High intensity fires can damage soils and often completely destroy riparian vegetation. Historically, low intensity fires often spared riparian areas, which reduced soil erosion and provided wildlife habitats following the event.

The absence of fire has had negative effects on grasslands, shrublands, and woodlands. Research in the last few decades has shown that many southern Oregon shrub and herbaceous plant species are either directly or indirectly fire-dependent.

Several shrub species are directly dependent on the heat from fires for germination. Without fire, these stands of shrubs cannot be rejuvenated. Grass and forbs species may show increased seed production or germination associated with fire.

Indirectly fire-dependent herbaceous species are crowded out by larger-statured and longer-lived woody species. This is particularly so for grasses and forbs within stands of wedgeleaf ceanothus and whiteleaf manzanita with a high canopy closure. High shrub canopy closure prevents herbaceous species from completing their life-cycle and producing viable seed. Many grass species may drop out of high canopy shrub lands in the absence of fire because of their short-lived seed bank.

Fire history recorded over the past 20 years in Southwest Oregon indicates a trend of more large fires which burn at higher intensities in vegetation types associated with low-severity fire regimes and moderate-severity fire regimes. This trend is also seen throughout the western United States. Contributing factors are the increase of fuel loading due to the absence of fire, recent drought conditions, and past management practices.

Fire Risk

Risk is the probability of when a fire will occur within a given area. Historical records show that lightning and human caused fires are common in the project area. Activities within this area such as dispersed camp sites, recreational use, and major travel corridors add to the risk component for the possibility of a fire occurring from human causes. The time frame most conducive for fires to occur in the project area is from July through September.

Information from the Oregon Department of Forestry database from 1967 to 1999 show a total of 71 fires occurred throughout the project area which burned a total of 1,075 acres. Lightning accounted for 25 percent of the total fires and human caused fires accounted for 75%. The following table is a break down of the fires within the project area:

Table 5: Number of fires in each size class within the Ferris-Bugman project area, between 1967-1999.

Total Number of Fires	Size Class
45	A (<.25ac)
21	B (.26-10ac)
4	C (10.1-100ac)

0	D (100.1-300ac)
1	E (300.1-1000ac)

The class E fire was 916 acres in size and was caused by a motorist. The four class C fires were 13, 15, 35, and 70 acres in size. All were human caused. A total of nine fires were caused by equipment. These nine fires burned less than 2 acres.

Fire Hazard

Fire hazard assesses vegetation by type, arrangement, volume, condition and location. These characteristics combine to determine the threat of fire ignition, the spread of a fire and the difficulty of fire control. Fire hazard is a useful tool in the planning process because it helps in areas within a watershed in need of fuels management treatment. Hazard ratings were developed for the project area. The following table summarizes the percentage of acres in each fire hazard rating category.

Table 6: Fire Hazard Ratings for the Ferris Bugman Project Area.

Fire Hazard Rating	Percentage of Acres in each Category
Low hazard	16%
Moderate hazard	37%
High hazard	47%

For additional information see ***Appendix F***.

G. WILDLIFE / T&E ANIMALS

Approximately 235 vertebrate wildlife species are known or suspected to occur in the proposed project area. A more detailed discussion on wildlife is included in Appendix W.

Threatened/Endangered Species

The northern spotted owl, a species listed as threatened under the Endangered Species Act (ESA) of 1973, as amended, is present in the project area. There is also potential for the presence of bald eagles, listed as threatened under the ESA. No other threatened and endangered wildlife species are known to occur in the project area.

Northern Spotted Owl

As part of the Northwest Forest Plan and BLM Resource Management Plan, spotted owl core areas were established around known spotted owl nests in 1994. The purpose of the owl cores is to provide suitable habitat for nesting owls and other late-successional species outside of the Late-Successional Reserve (LSR) system. This provides wider distribution of spotted owl populations and increases genetic exchange between populations in LSRs.

Four 100 acre spotted owl core areas (managed as Late-Successional Reserves under the RMP [USDI 1995a]) are located within the boundary of the Ferris-Bugman project. Four additional spotted owl core areas are located adjacent to the project area.

There are approximately 1,903 acres of suitable spotted owl habitat and 1,992 acres of dispersal-only habitat on federally managed lands within the project area boundary. Suitable habitat includes nesting, roosting or foraging habitat and generally has the following attributes: high degree of canopy closure (approx. 60%+), multilayered canopy, presence of large snags and coarse woody debris. Dispersal-only habitat provides spotted owls some

degree of protection from predators during juvenile dispersal and other movements, and generally has the following attributes: conifer stands with an average diameter of approximately ≥11 inches and 40-60 percent canopy closure.

Special Status Species
For purposes of management action concerns, species are recognized as "special status" if they are federally listed as Threatened or Endangered, proposed for federal listing as Threatened or Endangered, or if they are a BLM sensitive or assessment species. BLM policy is to manage for the conservation of these species and their habitat so as not to contribute to the need to list and to recover these species. Special status species known or suspected to be present within the proposed project area and their status are listed in Appendix W.

Survey and Manage/ Protection Buffer Species
The SEIS provides extra protection for some species through Survey and Manage (S&M) standards and guidelines (S&Gs). The S&Gs provide protection for sites known to be occupied by the species, and for some species also directs that surveys be conducted in proposed project areas if the project is "ground-disturbing". In order to comply with the S&Gs, the proposed project area was surveyed for the following S&M species; Siskiyou mountains salamander (*Plethodon stormi*), great gray owls *(Strix nebulosa)*, red tree voles (*Arborimus longicaudus*), and 2 species of terrestrial mollusks (*Helmintho glypta hertleini and Monadenia chaceana).*

The results of the surveys follow:
- Siskiyou Mountains salamander - Suitable habitat present, to date, two known sites located.
- Great gray owl - One nest site was located
- Red tree vole - No red tree vole nests found
- Mollusks - No S&M mollusk species were found.

Connectivity
Connectivity refers to landscape-scale, interconnected mature forest areas that provide continuous forest habitat for wildlife species movement. Many species are dependent on connectivity. This movement of individuals in the short-term is essential to the movement of genetic material and the prevention of genetic isolation in the long-term. Many forest species either cannot, or are reluctant to, move through large openings.

The Middle Applegate Watershed Analysis (USDI 1995b) indicates a need in this watershed for maintaining late-successional forest connectivity on south and west facing slopes between watersheds. The action alternatives would affect connectivity. Within the project area, connectivity is provided through a Riparian Reserve system, five one-hundred acre owl nest core reserves (four northern spotted owls and one great gray owl), and two wildlife connectivity corridors. These reserves provide internal travel corridors and habitat areas within the project area and connectivity to the larger landscape outside the project area. The two wildlife connectivity corridors designated within the project are located in areas identified in the Middle Applegate Watershed Analysis (USDI 1995b) as providing important connectivity to adjoining watersheds.

Landscape
An overview of the larger scale landscape of which the Ferris-Bugman project is a part, reveals that the project area has the most late-successional forest connectivity at the north end of the Slagle Creek area. There is also a Late Successional Reserve (LSR) to the west of the watershed that provides a connectivity link between other late successional forests.

H. BOTANY
Vascular Plant Species: Qualified botany contractors surveyed all of the proposed areas of activity for Bureau Special Status and Survey and Manage vascular plants, as well as the federally listed *Fritillaria gentneri*, during the 1998 field seasons. Surveys documented 66 occurrences for 12 species (Appendix B).

Non-Vascular Plant Species: All of the proposed activity areas were surveyed for the presence of Survey and Manage fungi, lichens, and bryophytes in the spring and fall of 1998 and in the spring of 2001, in accordance with established protocols. Surveys documented 17 occurrences for two species.

For additional information see ***Appendix B***.

I. CULTURAL RESOURCES

A field survey was conducted by a BLM contractor in 1997 and sites of cultural value were recorded. This would include historic or prehistoric ruins, graves or grave markers, fossils, or artifacts. The survey was reviewed by the District Archeologist and the State Historic Preservation Officer.

J. RECREATION

The Medford District RMP (USDI 1995a) designated 2,200 BLM acres in Ferris Gulch as an Off Highway Vehicle (OHV) area where OHVs are legally limited to existing roads and designated trails. The Ferris Gulch area receives extensive OHV use. Scattered OHV trails exist in Humbug and Slagle Creek Drainages.

Several non-motorized trails exist in the project area. These trails include the Enchanted Forest, Felton, Humbug-Slagle Connecting, and the Slagle-Foots Creek Connecting Trail in the Slagle Creek drainage. There are a number of trails in the Humbug Creek drainage which include the Packers Gulch, Kidney Gulch, T. Williamson, Humbug Nature Healers, Billy-Blue Saddle Trail in the Humbug Creek drainage. Many of these trails have access points through private property and are only used with permission.

K. RANGE

The Billy Mountain Allotment #20203 is located within the project area. Livestock preference is for 129 cattle from 4/16 to 6/30. The range report is in the EA file.

L. PRIVATE USES ON PUBLIC LANDS

The following table lists the private authorizations on public land in the project area.

Table 7: Private authorizations on public land within the Ferris Bugman project area.

Company or Individual	Location	Type of Authorization	Index No.
PP&L	38-4W-20	Utility R/W	OR51476
Worthylake, R.&P.	38-4W-17,20,29,30	Road R/W	OR54585FD
Henderson, G.	37-4W-31	Waterline R/W	OR41548
Prowse, R.&P.	37-4W-31	Road R/W	OR47260
Larson, T.&S.	37-4W-32	Road R/W	OR51452FD
Chapman, Ken	38-4W-10	FLPMA Lease	OR54454
Tipton, Paul	38-4W-11&12	Waterline R/W	OR33885
Burlingham, V.	38-4W-13	Road R/W	OR36238
Ore. State Police	37-3W-31	Comm. Site	OR40876

PP&L	38-4W-17	Utility R/W	ORE01122
Hanscom, Charles	SW¼S.5,T38SR4W SE¼S.6,T38SR4W	Mining Claim	ORMC19981
Provolt, Jack & Monte	NE¼S.7,T38SR4W	Mining Claim	ORMC153620,21
Norbert, Zwan	SE¼S.30,T38SR4W	Mining Claim	ORMC150969
Linda Rose Assoc., Inc.	SW¼S.6,T38SR3W SE¼S.6,T38SR3W	Mining Claim	ORMC14005,6 ORMC14795 1-4

CHAPTER IV
ENVIRONMENTAL CONSEQUENCES

A. INTRODUCTION

This chapter forms the scientific and analytical basis for comparison of alternatives. Discussions include the environmental impacts of the alternatives and any adverse environmental effects which cannot be avoided. It also identifies and analyzes mitigation measures which may be taken to avoid or reduce projected impacts. The impact analysis in the Medford District Proposed Resource Management Plan/Environmental Impact Statement (RMP/EIS)(Oct. 1994) analyzed the significant impacts associated with road building and commercial harvesting of conifers (pages 4-3 to 4-21) to which this EA is tiered.

The impact analysis addresses direct, indirect, and cumulative impacts on the affected resources of the human environment, including critical elements.

B. MITIGATION MEASURE

1. Eliminate harvesting overstory trees with a diameter class of over 20 inches DBH. This measure was requested by concerned publics from the Appleseed Project Analysis during 1999.

Silviculture: This mitigation measure would only work when large diameter trees are naturally spaced far apart from each other. Most of the time, this does not happen in the project area. This may be appropriate for the planned wildlife connectivity corridors. It may also be appropriate where only second growth Douglas-fir are to be commercially thinned. This measure would maintain large diameter trees but would not always reduce stand density levels enough or accomplish the current objectives for the desired species composition of the forest. Silviculturally there is no reason to protect trees 20 inches DBH and larger unless there is a specific project objective to do so.

Although we are treating landscapes and looking at projects from a broader perspective, it is important to note that when applying a marking prescription, we are looking at each individual tree based on its surrounding environment. For example, a 28 inch DBH tree could very well be next to a 36 inch DBH tree and the decision could be to remove the smaller tree in order to release the larger one. Southern Oregon stands are not uniform in nature.

It is important to use the best knowledge available to keep large trees in the ecosystem, and to promote more large trees and shade intolerant species. Using a general prescription with an imposed diameter limit of 20 inch DBH would limit our ability to meet these objectives or those set forth in the purpose and need statement in this EA.

Using a diameter limit prescription would put old-growth trees and shade intolerant species such as pines and incense cedar in jeopardy. Releasing true old-growth trees, pines and cedars would enhance their vigor. See "Thinning to Increase Vigor of Old-Growth Trees" by John Tappeiner and Penelope Latham (available in the EA file). Harvesting some 20 inch DBH and larger second growth Douglas-fir trees would create diverse stand diameter structure. We have already experienced the mortality of a large percentage of our true old-growth trees (both pines and Douglas-fir) because of high vegetation densities. If we do not harvest some 20 inch and larger second growth trees we would continue to lose trees over 200 years of age and our shade intolerant species. This contradicts the objectives of our silvicultural prescriptions (see Appendix). In uneven-aged management, trees are usually harvested in all diameter classes.

Most marking prescriptions have the objective of growing big trees or maintaining the large trees we currently have. Trees with old growth characteristics usually have large crowns with large limbs, indicating the tree once grew in an open condition. In order to develop our dominant trees into large (over 40 inches) diameter trees that

contain old growth characteristics, we need to thin around them. This includes creating open space around the live crown. This allows sun to fully penetrate the crown allowing it to photosynthesize, grow and put on diameter growth.

Some stands contain only a few remnants of these large old-growth trees. In many stands, ponderosa pine, black oak and madrone, were once important components. The amount of those species has now been reduced to only a few due to encroaching, more shade tolerant Douglas-firs. It is important that we begin to promote more shade intolerant species if we feel species diversity is the right goal.

Logging Systems: The Forest Creek landscape project has similar vegetative conditions and proposed harvest prescriptions to Ferris Bugman. Utilizing data from Forest Creek, it is observed that out of 72,750 merchantable trees slated for removal, six percent (6%) were over 20 inches in diameter. It is useful to note, however, that this Six percent (6%) equates to approximately 30% of the project sold timber volume.

As a general rule, logging system costs (falling, yarding, loading) are lower as the average diameter of trees removed are higher. The proposed action, including the logging of small, suppressed understory trees, in conjunction with using aerial logging methods in order to limit road construction, would create expensive logging costs. Imposing a 20 inch diameter limit may bring the appraised stumpage value to a minimal economic value or perhaps even below cost (10 % of pond value). This may limit the ability to sell the merchantable trees, thus impairing the ability to meet the purpose and need of the project. Consequently, other projects in the timber sale, such as those designed to reduce sediment in streams, replacing old culverts, or decommissioning roads, would need to be funded from non-timber sale sources. These additional funds might not be readily available.

Wildlife: All of the ecological health assessments and watershed analyses performed in the Applegate have indicated that there is a shortage of large trees. Large trees are important components of late successional wildlife habitat. Large trees turn into large snags, tend to have large horizontal limbs, and are more resistant to wildfire than smaller trees. Some species of wildlife need large trees for specific functions such as denning sites and nest trees. This measure would benefit these species for as long as these trees and snags persist and provide habitat. If the 20 inches diameter limit precludes the economic viability of the project as a whole, the long-term impacts would be negative to species which need large trees and snags because the increased tree growth resulting from thinning would not occur. Large trees for the future would not be produced in as great a number or as rapidly as if the thinning were to occur.

2. Reduce the length (1.6 BLM miles) of the proposed new, ridge road south of Slagle Creek. This would end the proposed road along the ridge just east of the section line between Sections 3 and 4, T38S,R4W.
If BLM does not construct the road across Boise Corporation (BC) land (SE¼ in Section 4, T38S,R4W), BC *may* decide to exercise their Right-of-Way through private land along Slagle Creek's riparian area.. Boise Corporation may decide to extend BLM's road and continue building it across their land to facilitate cable yarding.

Wildlife: Based on an estimated 4 acres of permanent clearcut per mile of new road construction, this mitigation measure would reduce the amount of various habitat types lost to road construction by approximately six (6) BLM acres. Shortening the length of the new road construction would lessen the potential for impacts to wildlife associated with vehicular and human disturbance. The potential for human disturbance would be addressed through closure of new roads with gates and federal closure to OHV use.

Fuels:
Limited access would impact approximately 185 acres of commercial forest lands and approximately 292 acres of pine/oak woodlands.

Impacts to Commercial Timber Stands: Without access, the type of burning that could be used to treat commercial timber land would be limited. Handpile burning could be used to mitigate any fuel hazard created by timber harvest operations. With limited access the cost of handpile burning increases by an average of 33% (from $301/acre to $450/acre). If mop-up is needed the cost could double because of limitations of water and crew access.

Future maintenance (underburning) of these stands could not be accomplished. The risk of escape is a major factor when conducting prescribed fire operations. Limited or no access increases the risk of escape due to the lack of availability and mobility of people, equipment, and water. These factors plus the proximity of private land makes the risk too high to underburn these areas.

Impacts to Non-commercial Base Land: Manual treatment (cutting of brush) and handpile burning could be accomplished to reduce the present fuel hazard. Limited access would increase the cost of operation by approximately 25% ($1,350/acre to $1,800). In order to maintain these areas in a low fuel hazard, underburning needs to occur on a routine basis. It is estimated that low intensity burns would be needed on a 5-10 year interval. This type of maintenance burning is also beneficial to species which are dependent on fire, such as the oaks, pines and native grasses. Limited or no access would preclude this type of treatment for the same reasons mentioned above.

Hydrology / Aquatic: This 1.6 mile section of road is located primarily in the Slagle Creek drainage. By not building this section of road, overall density of active roads in Slagle Creek would increase by 0.3 miles per square mile rather than 0.5 miles per square mile proposed under Alternative 2. This section of road crosses several dry draws and traverses upper, mid-slope areas to get around an area commonly known as Molly's Peak. At its closest approach, the 1.6 mile road section is over 800 feet elevation above fish-bearing portions of Slagle Creek, and is over 300 feet elevation above the nearest intermittent tributary to Slagle Creek. Sediment risk to headwater streams is greater through stream crossings and upper mid-slope areas than it is on the ridgetop portion of the road, so not building this road would eliminate any risk of sedimentation occurring from this source. However, given the location of the proposed road, the distance to streams, and the project design features that would be utilized in the design and construction of the road, there is virtually no risk that road-related fine sediment would be able to be transported to the aquatic system below; there would be no effect on the downstream aquatic system under either scenario. In the long term, BC may access their property from either the Slagle Creek riparian area below (for which they already have a Right-of-Way) to facilitate tractor logging, or by extending the BLM ridge road across BC land to facilitate cable logging. This scenario is less desirable than the proposed action: access from the Slagle Creek riparian area would likely involve ground disturbance and tractor yarding in close proximity to the creek (as occurred on this property in the past). If BC extended the BLM road, BLM would have no control over construction, drainage design or maintenance of that section of road.

Road construction through this area includes decommissioning approximately 1.2 miles of an old mining road that crosses two (2) small tributaries to the Applegate River in the drainage area along the Applegate River below Ferris Gulch, above Slagle Creek (AM 0509). This road would not be decommissioned with implementation of this mitigating measure, because the alternate access the new road would have provided would be eliminated. The old mining road road would continue contributing to increased peak flows and elevated sediment delivery to these streams from road surface erosion and runoff. Work to correct this problem in the future would be dependant on securing access from the lower end, obtaining future funding, and completing additional analysis to complete the work. This drainage (AM 0509) currently has a road density of approximately 9.0 miles per square mile. Density of active roads in drainage AM0509 would not decrease with implementation of this mitigating measure, a negative consequence compared to the decrease of 0.2 miles per square mile as proposed under Alternative 2. Implementation of this mitigating measure would allow direct delivery of sediment and runoff to intermittent streams and the downstream aquatic system to continue from this source.

Road density changes for Alternative 2 with acceptance of Mitigation Measure 2 are shown in Table H-9 of *Appendix H*. Road density changes for Alternative 2 with acceptance of both mitigation measures 2 and 3 are shown in Table H-11 of *Appendix H*.

Range: Decreases access, increases administration and monitoring cost.

Logging Systems: Access to approximately 285 acres of commercial forest land is affected by this proposal, including 185 acres proposed for thinning in the Ferris Bugman Project. Due to lack of access, the harvest system for the 185 acres would change from cable to helicopter yarding. In addition, the average yarding distance would double from approximately ½ mile to slightly over a mile. There would be an estimated cost increase in yarding ranging from $135/MBF to $260/MBF. The increased yarding cost would probably make this an uneconomical project.

Soils: Eliminating this portion of the road would decrease the amount of disturbance from the total proposed road construction by about five (5) percent. This portion of new road is proposed near and along the ridge line. Consequently, erosion and sediment yields are not predicted to be substantial. Eliminating this portion of the proposed road would maintain soil productivity on approximately six (6) BLM acres and would slightly reduce anticipated sediment yields.

If BLM does not construct the road across Boise Corporation (BC) land one of two possibilities could occur:
- BC *may* decide to exercise their easement through private land along Slagle Creek's riparian area to tractor yard their land (as was previously done in the last entry), or,
- BC *may* decide to extend BLM's road and continue building it across their land to facilitate cable yarding.

Short-term cumulative impact to soils would maintain soil productivity on two (2) BC acres and would slightly reduce potential sediment yields.

Future impacts from either tractor yarding and access through a riparian corridor or a road not built to BLM standards would increase anticipated sediment yields.

3. Eliminate the proposed new road construction (0.6 miles) along the northern portion of Slagle Creek (note; the first portion of this road is on lands owned by Indian Hill LLC who plans on constructing the road, on their land, during summer 2002. This mitigating measure only addresses the BLM portion in Section 33).

Wildlife: The new road construction would be an extension of the Foots Creek road system which is behind a locked gate. This gate is one of the most effective in the resource area. The Private landowner in the area makes sure the gate is locked and not tampered with. It is probably safe to assume that the new road construction would remain inaccessible to on-road vehicles. The ridge line where the new construction would start is used extensively by OHV and the additional road construction could encourage additional OHV activity farther south and closer to the "Enchanted Forest" and it's resident spotted owls. The Enchanted Forest Trail is currently closed to OHV use. Although the new road would also be closed to OHV use, the new road construction could encourage the development of a link trail between the new road and the existing closed trail. Not building the road would reduce the potential for vehicular (ORV/ATV disturbance of wildlife in the area, and reduce the potential for abuse of the existing Enchanted Forest Trail and nearby owl site.

Hydrology / Aquatic: This 0.6 mile section of road is located in the Slagle Creek drainage. By not building this section of road, overall density of active roads in Slagle Creek would increase by 0.4 miles per square mile rather than 0.5 miles per square mile proposed under Alternative 2. This section of proposed road is entirely on the

ridgetop. At its closest approach, the 0.6 mile road section is over a mile from fish-bearing portions of Slagle Creek, and is over 300 feet elevation above the nearest intermittent tributary to Slagle Creek. Sediment risk to headwater streams is greater through stream crossings and upper mid-slope areas than it is on ridgetop portions of roads. Given the location of the proposed road, the distance to streams, and the project design features that would be utilized in the design and construction of the road, there is virtually no risk that road-related fine sediment would be able to be transported to the aquatic system below; there would be no effect on the downstream aquatic system under either scenario.

Road density changes for Alternative 2 with acceptance of Mitigation Measure 3 are shown in Table H-10 of *Appendix H*. Road density changes for Alternative 2 with acceptance of both mitigation measures 2 and 3 are shown in Table H-11 of *Appendix H*.

Logging Systems: Approximately 230 acres of commercial forest land is affected by this proposal. Approximately 70 BLM acres of thinning would change from cable to helicopter yarding. The nearest potential helicopter landing is on land owned by Indian Hill, LLC. In addition, the average yarding distance would double from approximately 1800 feet to approximately 3900 feet. There would be an estimated increase in yarding cost ranging from $125 to $200/MBF.

Soils: Eliminating the proposed road along the northern portion of the ridge above the north fork Slagle Creek decreases new construction by approximately 0.6 miles of road. This road is proposed to be built along the ridge line so minimal sedimentation would occur in local waterways although approximately two (2) acres of land would be disturbed. The road is proposed to be completely surfaced and seasonally closed so erosion would return to near current levels after a few years. Not building the road would leave the area in near natural condition with erosion rates at minimal levels.

4. **Reserve all large trees in the two conifer stands located in the upper southeast reaches of Slagle Creek (north aspects in the NE¼NE¼ Section 9 and the SW¼SW¼ of Section 3, T38S,R4W).**
Wildlife: All of the ecological health assessments and watershed analyses performed in the Applegate have indicated that there is a shortage of large trees. Large trees are important components of late successional wildlife habitat. Large trees turn into large snags, tend to have large horizontal limbs, and are more resistant to wildfire than smaller trees. Some species of wildlife need large trees for specific functions such as denning sites and nest trees. This measure would benefit these species for as long as these trees and snags persist and provide habitat. If the 20" diameter limit precludes the economic viability of the project as a whole, the long-term impacts would be negative to species which need large trees and snags because the increased tree growth resulting from thinning would not occur. Large trees for the future would not be produced in as great a number or as rapidly as if the thinning were to occur.

C. CUMULATIVE EFFECTS ANALYSIS - Eight Principles of CEA

1. Cumulative effects are caused by the aggregate of past, present, and reasonably foreseeable future actions.
2. Cumulative effects are the total effect, including both direct and indirect effects, on a given resource, ecosystem, and human community of all actions taken, no matter who (federal, non-federal, or private) has taken the actions.
3. Cumulative effects need to be analyzed in terms of the specific resource, ecosystem, and human community being affected.
4. It is not practical to analyze the cumulative effect of an action on the universe; the list of environmental effects must focus on those that are truly meaningful.
5. Cumulative effects on a given resource, ecosystem, and human community are rarely aligned with political or administrative boundaries.
6. Cumulative effects may result from the accumulation of similar effects or the synergistic interaction of different effects.

7. Cumulative effects may last for many years beyond the life of the action that caused the effects.
8. Each affected resource, ecosystem, and human community must be analyzed in terms of the capacity to accommodate additional effects, based on its own time and space parameters.

For this analysis, the affected area is defined at two different spatial scales: Ferris Bugman project area (roughly Ferris Gulch, Slagle Creek, and Humbug Creek watersheds) and the 5th level watershed (the entire Middle Applegate Watershed). Ferris Bugman project area contains approximately 10,085 BLM acres and 9,426 private acres. The Middle Applegate contains 47,292 BLM acres, 2,077 U.S. Forest Service acres, 203 State of Oregon acres, and 34,013 private acres.

Past Actions generally refer to those post-European settlement, for example, commercial timber harvest on public and private land, road construction, and agricultural development in the valley bottom. For a summary of the effects of past actions, see the Middle Applegate Watershed Analysis (USDI 1995b, pages 9-19). The **Present Action** is defined as the Ferris Bugman project. Reasonably foreseeable **Future *federal* Actions** include upcoming scheduled BLM projects. Personal communication with representatives from the Forest Service indicated that there are no major Forest Service projects being planned in the Middle Applegate Watershed at this time. For reasonably foreseeable private actions, BLM assumes that all merchantable private forest land would be clearcut.

Baseline data for cumulative effects analysis is listed below. Impact Analyses (Direct, Indirect, and Cumulative) are listed after this baseline data under the specific resource analysis.

Past Actions

Since 1995 fuel hazard reduction work has occurred in the Middle Applegate Watershed. To date three landscape projects within this watershed have been implemented. These projects are the Lower and Middle Thompson Creek projects and the Forest Creek project. Along with these projects a small amount of acreage has been treated in the Appleseed project area which includes the Ferris Bugman project area. To date approximately 7,414 acres have been treated within the Middle Applegate Watershed. Of these acres 2,316 have been on non-commercial timber land. Treatments include manual, mechanical and prescribed burning. The following table displays the acres treated to date:

Unit Type	Total Acres
Shrubland	443
Shrubland/Grassland	310
Density Management	2,201
Fuel Break /Shrubland	20
Fuel Break Timber	483
Fuel Break / Shrubland	181
Grassland	241
PCT/Natural stands	1,996
PCT/plantation	26
Woodland	1,121

In addition to these acres approximately 4,400 acres are under contract to be treated in this watershed.

Breakdown of acres to be treated:

3,150 acres in the Forest Creek timber sales
132 acres of non-commercial land (slashbuster and manual)
580 acres Spencer Lomas Area
500 acres in the Lower and Middle Thompson Creek projects

Future landscape projects are planned over the next five years in the Middle Applegate Watershed. These areas include the China Gulch area, Chapman-Keeler area and the upper Thompson Creek drainage.

Since 1995 an estimated 1,780 acres of private land has been harvested and 8,955 acres of federal timber land has either been thinned or is under contract to be thinned on BLM and U.S. Forest Service managed land within the Middle Applegate Watershed. The following Table depicts this acreage by year sold.

Total acres harvested on public and private land in the Middle Applegate watershed: 1995-2000.

Year Sold	Acres Harvested
1995	719
1996	2052
1997	2607*
1998	1040
1999	2083
2000	454
Total	8,955

* Includes 220 acres of U.S. Forest Service thinning in Upper Thompson Ck.

Since 1995, 4.96 miles of new road has been constructed or is under contract to be constructed within the Middle Applegate Watershed on federal land in the Ashland R. A. In addition, 10.77 miles of roads have been or are under contract to be decommissioned within this watershed. Approximately 2.53 miles of temporary roads have been either been built and/or decommissioned or are under contract to be built and decommissioned. The following table shows this road work.

Road work completed on each BLM road on Ashland Resource Area BLM administered land within the Middle Applegate Watershed since 1995.

Road Number or Location	Miles Constructed	Miles Decommissioned	Temporary Road
37-3-26.1	2.65		
37-3-27.0	0.18		
T37SR3W27		0.30	
37-3-33.1			0.33

Road Number or Location	Miles Constructed	Miles Decommissioned	Temporary Road
37-3-33.2			0.17
38-2-19.1	0.28		
38-2-29.2	1.58		
38-3-5.1		0.50	
38-3-5.4		0.20	
38-3-6.1		0.40	
38-3-8.2		0.26	
38-3-9.3			0.46
38-3-15.2		0.40	
38-3-15.3		0.22	
38-3-15.4		0.13	
38-3-16.0		0.20	
38-3-26.0		0.30	
T38SR3W1,6,7		2.00	
38-4-1.1			1.57
38-4-20.0		0.20	
38-4-20.1	0.79		
38-4-28.2		0.60	
38-4-29.0	1.43		
Spur A	0.07		
T38SR4W27		1.60	
T38SR4W33		0.80	
39-3-5.1		0.10	
39-3-5.2		0.20	
T39SR3W9		0.90	
39-2-7.1	0.89		
Jeep Rd. A		0.91	
Jeep Rd. B		0.41	

Road Number or Location	Miles Constructed	Miles Decommissioned	Temporary Road
Jeep Rd. C		0.14	
Totals	4.96	10.77	2.53

Present Actions

Breakdown of land ownership and treated acres proposed (Alt. 2) in the Ferris Bugman project area.

Description	Total Area (acres)
Private land within the Ferris Bugman Project	9,426
BLM administered land within the Ferris Bugman Project	10,081
Conifer forest on BLM administered land within Ferris Bugman Project	4,906
Conifer forest being proposed for thinning/stand density (commercial)	1,856
Conifer forest being proposed for thinning/stand density (precommercial)	311
Non-commercial sites proposed for thinning and prescribed burning with a follow-up maintenance burn within the next 10 years.	1,537

Future Actions

Precommercial thinning of 1,282 acres are planned, in the near future, on federal land within the Ferris Bugman Project area. Commercial timber harvesting projects being planned on federal land within the Middle Applegate watershed on the Ashland R.A. in the foreseeable future are China Well, Chapman Keeler (FY 2003) and Upper Thompson (FY 2004). The amount of acreage to be harvested and the type and amounts of road work are unknown at this time because of the lack of completed pre-treatment surveys and site specific analysis.

Non-commercial treatments include the Slashbuster IV project which is planned for FY 2002. This project involves 1,400 acres in Humbug Creek, Long Gulch, and China Gulch watersheds.

D. HYDROLOGY, RIPARIAN RESERVES AND FISHERIES

Summary: Effects within the Project Area, by Alternative, on Hydrology, Riparian and Fisheries.

Table 8: Summary of Effects within the Project Area, by Alternative, on Hydrology, Riparian and Fisheries. Key: 0 = no effect (i.e. no change from existing conditions); + = beneficial effect; - = low adverse effect; - - = moderate adverse effect; - - - = high adverse effect

Analysis Variable	Alternative 1		Alternative 2		Alternative 3	
	Short Term	Long Term[1]	Short Term	Long Term	Short Term	Long Term
Streamflow and Groundwater	0	- / - - -	+	+	+	+

Analysis Variable		Alternative 1		Alternative 2		Alternative 3	
		Short Term	Long Term[1]	Short Term	Long Term	Short Term	Long Term
Stream Morphology/Stream Channels	Channel structure (large wood)	0	+ / - -	+	+	+	+
	Width-to-depth Ratio	0	0 / -	+	+	+	+
Water Quality	Stream Temperature	0	0 / -	0	0	0	+
	Fine Sediments	0	- / - - -	0	+	0	+
Riparian Reserves/Riparian areas		0	+ / - -	+	+	0	+
Fish and Aquatic Habitat		0	+ / -	+	+	0	+
Threatened and Endangered Fish, Critical Habitat, and Essential Fish Habitat		0	+ / -	0	+	+	+

1/ Potential long-term effects under Alternative 1 include a high risk for a severe intensity, stand-replacement fire. Long-term effects are shown for no major fire followed by a '/' and then for effects resulting from a major fire.

Effects of Alternative 1 (No Action) on Hydrology, Riparian Reserves and Fisheries

Direct Effects

Streamflow and Groundwater
Stream Morphology/Stream Channels
Water Quality
Riparian Reserves/Riparian Areas
Fish and Aquatic Habitat

Alternative 1 would have no direct effects on streamflows, groundwater, stream channels, channel morphology, water quality, Riparian Reserves, or riparian areas in the project area. With no on-the-ground actions, there would be no direct improvements or damage to fish and other members of the aquatic biotic community or to aquatic habitat.

Indirect Effects

Streamflow and Groundwater

Under Alternative 1, the current conditions in the project area would continue. In some parts of the project area, old, unmaintained roads–those proposed for renovation or decommission under Alternatives 2 and 3–would continue to capture and rapidly route storm runoff to small streams. Where this is occurring, these stream channels and areas downstream would remain at increased risk of scouring and downcutting.

Some headwater stream channels would continue to experience the opposite situation. Alternative 1 would continue a long-term trend of "hands-off" management. Dense stands of trees and brush would continue to have the potential to extract far more water from the soil than is available under the climate regime, limiting water available for runoff, groundwater, and summer low flows. As a result, stream sediments in some headwater drainages could accumulate, lacking the peakflows necessary to distribute them downstream. Fortunately, such stored sediment could store more water (if available), potentially reducing peakflow magnitude or improving summer low flows by gradually releasing stored water downstream.

However, a severe, stand-replacement fire could drastically alter streamflow and groundwater regime. The loss of vegetation would immediately increase water availability to groundwater and streams. However, without vegetation to slow down the runoff, a greater percentage of the water would runoff immediately after storm events, never making it into groundwater storage. Peakflows would dramatically increase, scouring out the stored colluvial layers in headwater streams. The likelihood of debris torrent (a large slug of rocks, trees, dirt, etc. pouring down a stream channel) would increase resulting in an additional loss of water storage capability. As explained in the "Fire" section, the risk of a severe, stand-replacement fire would continue to be very high under Alternative 1.

Stream Morphology/Stream Channels
Under Alternative 1, roads would be improved on the normal road maintenance schedule for Medford District. Until repaired, undersized or damaged culverts would continue to promote channel headcutting below roads with inadequate energy dissipaters. A few old, rutted roads would continue to channel stormflows, increasing peakflows in some small streams and possibly increasing channel scouring or downcutting.

Under Alternative 1, the dense forest stands would continue to slow tree growth. As a result, dying trees would be of small diameter, rot faster, and provide less channel structure when they eventually end up in streams. In the absence of severe, stand-replacement fires, the forests would slowly restore themselves over tens or hundreds of years. Eventually, channel structure would improve, as large wood became available. A severe, stand-replacement fire would kill trees both in the uplands and in Riparian Reserves. Although dead riparian trees would immediately increase large-diameter fallen wood on the ground and across stream channels (see, for example, what happened after the Quartz Fire), the loss of much upland forest would remove potential for future instream wood recruitment until the forests on slopes above the streams are again filled with large-diameter trees.

Width-to-depth ratios of some streams would remain wider than would be expected, due to some roads delivering runoff quickly to streams following storm events. In the event of a major fire with high severity over a broad area, higher peakflows would likely widen streams even more.

Water Quality
Alternative 1 will continue current water quality conditions. Stream shade on BLM-administered lands would be maintained, keeping water temperatures cool. Road problems as described in "streamflow" and "stream morphology," above, would continue to route road fine sediments into some small streams. A severe, stand-replacement fire would eliminate stream shade along burned riparian areas, which could result in increased water temperatures. It could also result in levels of soil erosion and sedimentation that are much higher than those existing. Any mechanism that promotes groundwater storage (as opposed to immediate loss through peakflow) would help keep stream temperatures cool.

With no new closures of roads with gates and barricades, and no road decommissioning, there would be no reduction in sediment input from traffic on project area roads. There would be no decrease in roads open for OHV use. OHVs include motorcycles, all terrain vehicles (ATVs), and 4WD vehicles that are driven off existing roads. Users of OHVs often form their own roads and trails by repetitive use that wears down the surface cover. Rutting is common and may form channels where water can flow. Erosion is in two forms: mechanical detachment and concentrated flow of surface water (Maurer and Glover 1995).

Riparian Reserves/Riparian areas
Although many riparian areas in the project area are in Proper Functioning Condition, many others suffer from the effects of a century of gold mining, fire suppression, and various types of vegetation management. Under Alternative 1, current riparian conditions would be maintained through the near future on BLM-administered lands within the project area. Natural restoration would take place very slowly, barring a major perturbation. Over the long-term, trees would increase in size, although the growth rate would be much slower on some

streams due to overly-dense stands. Trees could eventually achieve late-successional characteristics and provide habitat and large wood recruitment. However, the risk of a severe, stand-replacement fire in riparian areas would remain very high due to the dense stands. A severe fire could set back riparian recovery back by many decades.

Fish and Aquatic Habitat
Protecting current riparian and upland vegetation conditions will continue the trajectory of very slow recovery for damaged aquatic habitat. Without a severe, stand-replacement fire, riparian areas will slowly develop late successional characteristics and instream wood levels would eventually improve. In some streams, the stream morphology and water quality problems due to old, unmaintained roads will continue to compromise habitat for aquatic insects, amphibians, and other aquatic species that use intermittent streams. In the case of a severe, stand-replacement fire, entire riparian areas could be killed. In such a situation (observed in some Quartz Fire drainages), fire-killed trees would immediately increase CWD but soil erosion could overwhelm even that increased sediment storage capacity. Large amounts of fine sediments and/or channel downcutting could compromise habitat quality in burned-over streams. (Fine sediments limit habitat and food availability for fish and other aquatic organisms.) However, the impacts of fire would obviously depend on many factors like weather, fuel moisture, location, etc. Even stand-replacement fires rarely burn the entire forest. Some riparian and upland forest patches would probably remain unburned and provide refugia for aquatic wildlife. In addition, the loss of vegetation in a severe fire would immediately increase the amount of water in stream channels, potentially increasing habitat for a few colonizing organisms.

Cumulative Effects
With implementation of Alternative 1, conditions related to hydrology, riparian areas, and fisheries would continue as described in Chapter 3. Vegetation densities would continue to increase in many areas, and the risk of high severity effects from wildfires would continue to be very high across much of the landscape.

With the implementation of the Applegate Fire Plan by many landowners (an effort currently underway in the Subbasin), the current risk of negative impacts from severe fire effects may be gradually reduced in the future in some areas. Because of the extent of BLM-administered lands in the Applegate, the lack of treatment on federal lands would be counterproductive to implementation of the Fire Plan, putting riparian and aquatic resources at greater risk on both federal and private lands.

Although intensive timber harvest has not been recently occurring on a large scale in this portion of the Applegate, it is possible this could change at some point in the future. With over 8000 acres of potentially merchantable timber on private lands in the drainages around the Ferris Bugman project area, a return to large scale removal of the most fire-resistant trees combined with increasing densities of small diameter trees and brush in those same areas could negatively impact the hydrologic and aquatic functioning of the area, especially if such activities included high levels of ground disturbance. Conversely, thinning of the smaller diameter materials and brush to produce stands of larger, more fire-resistant trees could have a positive effect on those same 8000 acres. The thinning and periodic underburning of many thousands of acres of additional woodlands and shrublands on private lands could also improve hydrologic and riparian function. This is a conceivable scenario with the gradual implementation of fuel-reduction strategies throughout the Applegate.

Streamflow and Groundwater
Increasing densities of vegetation would continue to use much of the available soil moisture, allowing very little to infiltrate to deeper soils (where it could be available to larger trees) and groundwater. Summer streamflows would continue to be lower than would be expected with more open stand conditions. Peakflows would also continue to be lower due to reduced rates of runoff from the dense vegetation. Possible future timber harvests on private lands, particularly clearcutting, could temporarily increase peakflows on local streams. As additional

residential wells are drilled, limited groundwater supplies throughout the area may not be sufficient to meet demand.

A major fire would likely have negative consequences to both peakflows and groundwater, with stormflow running off much more quickly and less making it into groundwater. With the lack of any vegetation treatments on federal lands under this alternative, the potential for severe fire effects would continue to increase on much of the project area.

Stream Morphology/Stream Channels
Current processes affecting stream channels would continue as discussed in Chapter 3. Sediment and flow effects to stream channels from road-related sources would continue to be a major impact across all ownerships. A lack of large wood in many streams would continue to be a negative effect on channel complexity. The risk of channel sluice-outs from debris torrents could continue to increase over time, as discussed in Chapter 3 and *Appendix H*.

Water Quality:
Management actions on private lands may still prevent stream temperatures from meeting the State water quality criteria. Beneficial uses sensitive to stream temperatures, such as cold water fish and other aquatic life, would not thrive under water temperatures that exceed the State criteria.

Riparian areas/Riparian Reserves
Fish and Aquatic Habitat:
Riparian Reserve habitat and condition would remain the same. The ability of Riparian Reserves to withstand forest fires and control sediment impacts would remain compromised. In a natural system, this might not be an issue, because wildlife could move to better habitat elsewhere, plants could re-seed from adjacent areas, and aquatic animals would also repopulate. However, the residential, commercial, agricultural and transportation impacts on private land in nearby mountain as well as streams valleys, rivers, and estuaries limit animal migration, block fish passage, divert water, and in general have seriously reduced riparian habitat. Consequently, severe fires or other landscape-level changes due to inaction may further impact already-stressed riparian systems.

Effects of Alternative 2 (Preferred Alternative– more road construction and treatment areas) on Hydrology, Riparian Reserves and Fisheries
For a discussion about the relationship of the proposed action to the objectives of the Aquatic Conservation Strategy, see *Appendix C*. All impacts related to hydrology, Riparian Reserves and Fisheries with the implementation of Alternative 2 would be less than what was analyzed for in the Medford District RMP (USDI 1995a), due to less intensive harvest and less road construction than was originally evaluated for.

Direct Effects
Streamflow and Groundwater
Alternative 2 would have no direct effects on the streamflow regime in the project area. Note that the new roads only cross dry draws, well away from any active streams. Road renovation and decommissioning will repair or remove ruts, ditches and other places where roads gather and channel large amounts of water into dry draws or streams (a common problem with poorly-maintained roads) [REF].

Thinning conifer stands and shrublands with fire or thinning techniques may cause an immediate increase in groundwater availability, as fewer trees and shrubs take up water. As trees grow and increase their canopy size (and therefore, water demands) the extra amount of groundwater will probably decrease. [REF]

Stream Morphology/Stream Channels

Under Alternative 2, decommissioning roads will directly effect channel morphology at certain locations in the project area. When decommissioning roads, old culverts (usually undersized) and any associated fill dirt are removed. Stream channels at these locations would be immediately restored to a more natural configuration and reconnected to the floodplain (where a floodplain exists). Removing the metal pipes will restore the stream bottom's natural material substrates. None of the other project work will directly effect stream morphology.

Water Quality
None of the projects proposed in Alternative 2 would have any direct effect on stream temperatures. Stream shade will be maintained with all vegetation treatments in both commercial and non-commercial areas. The new road will not cross Riparian Reserves and associated stream channels, so stream shade cannot be compromised by the project.

The Project Design Features (Chapter 2) include Best Management Practices to ensure compliance with Oregon state water quality standards.

Alternative 2 would have no direct effect on instream sediment levels.

Riparian Reserves/Riparian areas
Thinning commercially-sized trees <16" in a few Riparian Reserves could immediately increase light levels in those reserves, a desired result meant to promote understory growth. Riparian Reserves only pre-commercially thinned would probably experience little change in light levels since the tree overstory remains intact. In all treated Reserves, stream shade would be maintained to protect water temperatures. Riparian-dependant or rare tree/shrub species would not be cut, so vegetative (and consequently, habitat) diversity would be protected. Dropping and leaving trees in Riparian Reserves would immediately increase the amount of downed wood adjacent to and across the intermittent channels, a benefit for wildlife habitat, nutrient addition and sediment control.

Project design features for fuel treatments would minimize direct effects (e.g. unplanned loss of riparian vegetation) to Riparian Reserves from underburning or handpile burning. New permanent road construction would not enter any Riparian Reserves within the project area; therefore, it would have no direct impact.

Fish and Aquatic Habitat
This project would have no direct effect on any fish species or fish habitat. However, removing culverts for road decommissioning will immediately remove migration barriers for other aquatic and terrestrial wildlife. In flowing streams, aquatic insects and amphibians could more easily access upstream areas. Along intermittent creek beds, terrestrial wildlife would have an unimpeded, protected migration corridor for daily or seasonal movement. Similarly, replacing undersized culverts with culverts sized for a 100-year flood event may remove a migration barrier in some instances.

Indirect Effects
Streamflow and Groundwater
Ultimately, the actions proposed in Alternative 2 should have no negative indirect effect on peakflows or summer low flows. There may be some small improvements in peakflow levels.

Under Alternative 2, active road density (open, closed, and unknown roads) in the project area would remain roughly the same at 6.0 miles per square mile after 5.9 miles of new road are constructed, 7.1 miles of existing road are decommissioned, and 0.9 miles of temporary road are decommissioned. Active road densities would be most reduced in several of the drainage areas currently having the highest road densities (Table 9), resulting in a slight reduction in frequency and/or magnitude of peak flows. Slagle Creek is the only drainage area that would incur an increase in active road density, from approximately 3.6 to 4.2 miles per square mile. The location of the

proposed roads in relation to Riparian Reserves, as well as the Best Management Practices and PDF's used for new road construction should eliminate the possibility of road-related peakflow increases.

Road renovation under Alternative 2 is proposed for approximately 18.3 miles. Drainage improvements would include adding cross drains and replacing under-sized culverts. Reducing the distance between drainage structures would decrease the rapid, concentrated routing of water to streams during storm events. Properly-sized culverts would reduce the potential for plugging and subsequent "blow-outs" that could move large amounts of road fill into stream channels. Replacing "shot-gun" culverts would reduce downstream headcutting and channel erosion. In addition, road decommissioning would disconnect an additional 7.1 road miles from the hydrologic network. Subsurface flows would no longer be intercepted and routed down ditchlines, thus reducing the magnitude of peak flows in small stream channels nearby. It is unlikely that these peakflow improvements will have a large effect on primary, fish-bearing streams or the Applegate River.

Thinning and prescriptive fire proposed in Alternative 2 may indirectly affect streamflows by helping to prevent the severity of summer wildfires. A "cooler," underburning fire does not usually kill large trees and is often patchier (leaving more unburned areas) than a severe, stand-replacement fire. Consequently, streamflows would probably increase with the removal of some vegetation, but may be more "in balance" with appropriate water:sediment relationships. Downcutting and debris torrents would be less likely.

Table 9. Ferris Bugman Project Area Post-project Road Density Changes - Alternative 2

Drainage Area Number [1] (see Table H-1)	Alternative 2 Miles of Road Disturbance [2] (Alternative 2 changes from existing condition [Table H-5] in parentheses)							Total miles	Total miles per square mile
	Active Roads					Inactive Roads			
	Unknown Roads	BLM Open Roads	BLM Closed Roads	Total Active Roads	Total Active Roads per square mile	BLM Decommissioned Roads	BLM Obliterated Roads		
AM 0327 AM 0330	24.3	0.2 (-0.1)	0.6 (+0.1)	**25.0**	**8.9**	0.0	0.0	**25.0**	**8.9**
AM 0333	46.6	0.3 (-4.9)	5.3 (+4.2)	**52.0 (-0.7)**	**4.6 (-0.1)**	4.0 (+4.0)	0.0	**56.0 (+3.3)**	**5.0 (+0.3)**
AM 0336	7.9	0.0	0.0	**7.9**	**5.7**	0.0	0.0	**7.9**	**5.7**
AM 0503	18.6	0.1	0.0	**18.7**	**6.0**	0.0	0.0	**18.7**	**6.0**
AM 0506	12.0	4.1 (-3.9)	4.2 (+1.5)	**20.3 (-2.4)**	**7.3 (-0.9)**	3.2 (+2.8)	0.3	**23.8 (+0.4)**	**8.7 (+0.1)**
AM 0509	45.6	0.7 (-1.2)	0.7	**47.0 (-1.2)**	**8.8 (-0.2)**	1.2 (+1.2)	0.0	**48.2**	**9.0**
AM 0512	20.1	0.6	4.4 (+3.1)	**25.1 (+3.1)**	**4.2 (+0.5)**	0.0	0.0	**25.1 (+3.1)**	**4.2 (+0.5)**
TOTAL	**174.8**	**5.9 (-10.2)**	**15.2 (+9.0)**	**195.9 (-1.2)**	**6.0 (-0.0)**	**8.4 (+8.0) [3]**	**0.3**	**204.6 (+6.8)**	**6.3 (+0.2)**

1/ Drainage areas: **AM0327**/**AM0330**-Applegate River below Keeler Creek, above Humbug Creek; **AM0333**-Humbug Creek; **AM0336**-Applegate River below Humbug Creek, above Thompson Creek; **AM0503**-Applegate River below Thompson Creek, above Ferris Gulch; **AM0506**-Ferris Gulch; **AM0509**-Applegate River below Ferris Gulch, above Slagle Creek; **AM0512**-Slagle Creek. See Table H-1 (Appendix H) for details.
2/ Slight differences in mileage from those cited elsewhere in the document are the result of source map variation and rounding error introduced by analyzing at different spatial scales. Cumulative differences are generally less than 0.1 mile. An additional 1.1 miles of previously open road to be closed are outside the project boundary and analyzed drainage areas, and are not included here.
3/ Includes 0.9 miles of temporary road that will be built then decommissioned.
4/ Rounding visible values to tenths resulted in some values that appear to be off by a tenth, but are in fact correct.

Stream Morphology/Stream Channels

Under Alternative 2, road decommissioning at stream and draw crossings would remove culverts and allow channels to return to their natural form. Road drainage improvements would reduce the amount of channel downcutting and streambank erosion occurring at culvert outlets. Road maintenance cannot stop the interception of subsurface flows; but redesigning road drainage to interrupt on-road flow and prevent concentrated flow from reaching streams would significantly reduce stormflow to small drainages near roads. It is likely that channel downcutting or scouring would be reduced in these streams.

New road construction would cross several dry draws (no evidence of scour, deposition, or defined channel) but no active streams or Riparian Reserves. With the project design features and construction practices being used on this project, there is virtually no chance of road-related sediments being transported to active streams from this source.

Thinning commercially-sized (<16"dbh) trees in a few Riparian Reserves would increase the growth rate of the remaining trees in those Reserves. Over the years, the streams would receive larger-diameter dead wood (from

natural tree death) than if the stands had remained unthinned. Larger-diameter logs rot slower, are generally more stable, and provide more channel complexity than smaller-diameter logs. More complex stream channels have a more balanced water:sediment relationship, with higher summer low flows and better aquatic habitat. Width-to-depth ratios of many streams would be expected to decrease with increasing channel complexity. Pre-commercial thinning in a few Reserves may also improve remaining tree growth rates.

In the event of a severe, stand-replacement fire, trees in thinned Reserves would have a better chance of surviving to provide even larger wood in the future. Less fuel would be available for the fire to burn, and trees would generally be spaced farther apart, inhibiting the speed at which fire can ignite adjacent trees. However, the impact to individual Riparian Reserves depends so much on wind direction, fuel loading, fuel moisture, weather, and terrain, that it is impossible to make any kind of accurate prediction. It is very likely that in a severe wildfire, many riparian trees would be killed, immediately increasing instream wood.

In the event of a severe wildfire, the thinned uplands may experience more underburns, rather than stand-replacement burns. If so, the chances of a debris torrent dumping fire-killed trees into stream channels would be reduced.

Water Quality
The road work proposed under Alternative 2 could add slight, undetectable amounts of fine sediments to stream channels in the project area. However, PDF's and BMP's are strict in order to block all routes for fine sediments to enter stream channels during road construction, renovation, or decommissioning. (See "Fish" below for further discussion on biological relevance.) Locating temporary roads on or near ridges, water barring skid trails, and filtering by vegetation in Riparian Reserves would reduce or prevent sediment from reaching streams. If levels of sediment from road or vegetation management activities reached waterways within the project area, the increase would be very slight, and would return to baseline rates within a few years. Any sediment increases in The Applegate River that result from the proposed road work would be minute and indiscernible from current sediment levels. Seasonal hauling restrictions (see Chapter 2) and road renovation on haul roads should reduce sediment input to streams to undetectable, insignificant levels.

Road renovation and decommissioning is proposed under Alternative 2 specifically to reduce fine sediment input to streams. For example, removing or replacing under-sized culverts would reduce the potential for plugging and subsequent "blow-outs" that could move large amounts of road fill into stream channels. Adding water bars and rolling water dips to route surface water away from streams, and seeding decommissioned roads will immediately remove sediment routes to stream channels. Ripping some decommissioned roads will encourage natural tree and shrub seeding and subsequent growth. Chapter 2 contains a list of all the PDF's used for road work.

The closing of roads with gates and barricades would help reduce sediment input by restricting traffic use on those roads. This is especially important during the winter season when erosion potential and sediment production is highest, and would be greatly increased by road traffic. Therefore, closing these roads would result in a long-term decrease in sediment production.

The closing of proposed new roads and decommissioned roads would limit the area available for OHV use and decrease the erosion and sediment production due to OHV. OHV include motorcycles, all terrain vehicles (ATVs), and 4WD vehicles that are driven off existing roads. Users of OHV often form their own roads and trails by repetitive use that wears down the surface cover. Rutting is common and may form channels where water can flow. Erosion is in two forms: mechanical detachment and concentrated flow of surface water (Maurer and Glover 1995).

Alternative 2 would have no indirect effect (positive or negative) on stream temperatures in the project area, since stream shading will be protected along all streams. For the same reasons, Alternative 2 would not have any positive or negative effect on water temperatures in the Applegate River, a 303(d)-listed water body. Stream shading may improve along decommissioned roads in Riparian Reserves, but it is unlikely that the increase in shading will have any measurable effect on stream temperature. In addition, the Applegate Dam would continue to regulate flows in the Applegate River.

Riparian Reserves/Riparian areas
Under Alternative 2, pre-commercial thinning within several intermittent stream Riparian Reserves would allow trees to attain late-successional characteristics sooner than if left in an unnatural, overly-dense condition. In the long-term, increased stand structure and diversity would lead to improved habitat conditions within Riparian Reserves. Treatment of overly-dense vegetation in the uplands and Riparian Reserves would reduce the likelihood that a severe, stand-replacement fire would destroy the riparian areas. Riparian connectivity would be enhanced with the decommissioning of a number of roads within Riparian Reserves. The percent of riparian areas currently assessed as nonfunctional or functional-at-risk with a downward trend would be expected to decrease in the long-term, as riparian and watershed conditions improve. The impacts from the vegetation treatments would be less than would occur in these same areas from fires under natural conditions.

Fish and Aquatic Habitat
Since so few Riparian Reserves would be treated, and the treatments would be so slight, it is doubtful that the treatments proposed under Alternative 2 have any indirect impact (positive or negative) on downstream fish habitat or riparian habitat across the Middle Applegate Watershed. However, habitat and function would be improved in those few treated Reserves. These treated Reserves would provide more habitat diversity, refugia in the case of large fires or other landscape-level changes, and better sediment control for downstream fish habitat.

If the upland treatments do improve available groundwater, this may have some small benefit to aquatic habitat. Although slight, a little bit more groundwater would improve or prolong humidity in some Riparian Reserves. This humidity creates microhabitats for riparian-dependant plants and animals (like bigleaf maple and salamanders), or extends the growing season for others. Upland conifer thinning, prescribed fire and shrub/grass/oak woodland treatments would improve overall watershed health, ultimately benefitting aquatic systems by restoring more natural ecological processes.

Finally, reducing sediment input or channel erosion with road renovation and decommissioning will decrease fine sediment inputs and help restore an appropriate water:sediment balance in small, adjacent streams. These changes will slowly improve stream habitat for aquatic wildlife (probably primarily insects and mollusks in the Ferris-Bugman area) as streams flushes old fines downstream with winter rains..

Cumulative Effects
With implementation of Alternative 2, conditions related to hydrology, riparian areas, and fisheries would continue as described in Chapter 3. Vegetation densities would be reduced is portions of the project area, and the risk of high severity effects from wildfires would be reduced in some areas, increasing the likelihood of underburns or patchy burns rather than stand-replacement fire.

With the implementation of the Applegate Fire Plan by many landowners (an effort currently underway in the Subbasin), the current risk of negative impacts from severe fire effects may be gradually reduced in the future in some areas of private lands. Because of the extent of BLM-administered lands in the Applegate, the treatments proposed on federal lands would complement implementation of the Fire Plan, enhancing the probability of

achieving successful results on both federal and private lands, and improving overall riparian/aquatic system health and connectivity in the Applegate Subbasin.

Although intensive timber harvest has not been recently occurring on a large scale in this portion of the Applegate, it is possible this could change at some point in the future. With over 8000 acres of potentially merchantable timber on private lands in the drainages around the Ferris Bugman project area, a return to large scale removal of the most fire-resistant trees combined with increasing densities of small diameter trees and brush in those same areas could negatively impact the hydrologic and aquatic functioning of the area, especially if such activities included high levels of ground disturbance. Conversely, thinning of the smaller diameter materials and brush to produce stands of larger, more fire-resistant trees could have a positive effect on those same 8000 acres. The thinning and periodic underburning of many thousands of acres of additional woodlands and shrublands on private lands could also improve hydrologic and riparian function. This is a conceivable scenario with the gradual implementation of fuel-reduction strategies throughout the Applegate.

Streamflow and Groundwater
While high densities of vegetation would continue to use much of the available soil moisture, allowing very little to infiltrate to deeper soils (where it could be available to larger trees) and groundwater, conditions could begin to improve in areas that receive treatment under this project or under projects on other ownerships related to the Applegate Fire Plan.. Summer streamflows may begin to improve in some streams as treatments produce more open stand conditions allowing greater infiltration of winter rains into groundwater. As additional residential wells are drilled, limited groundwater supplies throughout the area may not be sufficient to meet demand, regardless of any increases in available groundwater. Peakflows may increase slightly from currently depressed levels. Possible future timber harvests on private lands, particularly clear cutting, could temporarily increase Peakflows on local streams, but this effect would be short-lived as small trees and brushy vegetation grow up on those sites. Thinning in surrounding uplands would likely increase soil moisture available to riparian areas at certain times of year. Available groundwater could increase from such activities, as well.

A major fire would likely have negative consequences to both peakflows and groundwater, with stormflow running off much more quickly and less making it into groundwater. As vegetation treatments designed to more closely mimic natural stands are completed on more of the landscape, the potential for severe fire effects would begin to decrease in portions of the project area.

At the watershed scale, detectible changes in flow conditions are not likely unless much more extensive projects are completed, due to the spatial scattering of the treatment areas, the use of silvicultural prescriptions which do not create large openings, and the existence of Riparian Reserves.

Stream Morphology/Stream Channels
Sediment and flow effects to stream channels from road-related sources would continue to be a major impact across all ownerships, but would be improved considerably on BLM administered lands due to reductions in the interactions of roads with streams, due to road renovation, decommissioning, and relocation to less impacting places on the landscape. A lack of large wood in many streams would continue to be a negative effect on channel complexity, but treatments which increase the probability of riparian trees reaching large size would eventually begin to provide increasing levels of large wood. Levels of large wood to some streams could continue to decline with increased levels of timber harvest on private lands.

Gradual increases in peakflows from currently depressed levels in some small streams may lead to better sorting of instream gravels and removal of fine sediments onto banks and floodplains during high flows.

Areas with reduced risk of severe fire due to vegetation treatments would be less likely to suffer negative effects to stream channel conditions over the long-term.

Water Quality
Stream temperatures in the area would continue to be heavily influenced by riparian conditions on private lands, as discussed in Chapter 3 and Appendix H. Large-scale efforts to deal with high vegetation densities may decrease the potential for negative impacts to stream temperature from severe wildfire. Overall improvement in stream temperatures depends on improvement in riparian conditions along many streams, particularly the larger, valley-bottom perennial streams that contain water during the times of the year when high stream temperatures are a concern. Management actions on private lands may still prevent stream temperatures from meeting the State water quality criteria. Beneficial uses sensitive to stream temperatures, such as cold water fish and other aquatic life, would not thrive under water temperatures that exceed the State criteria.

Riparian Reserves/Riparian areas
Gradual improvement in the functioning condition of riparian areas on federal land will have a beneficial effect on downstream aquatic habitat on private land, as well. Although conditions on some portions of private land are improving while others decline, the improvement of conditions on federal lands will benefit private lands either way. Cooperative efforts among landowners in the watershed should leave to improving riparian conditions over the long term.

Fish and Aquatic Habitat
Given all the current and past impacts to riparian areas on both public and private land throughout the watershed (e.g. highways, residences, fire suppression, commercial businesses, farming, river channelization, gravel mining, logging, gold mining) it is doubtful that the small amount of thinning in Riparian Reserves would improve overall riparian health. However, every little bit of restoration helps.

Reduced wildfire impacts would lessen the risk of severe habitat impact to downstream fish. Road decommissioning and drainage improvements would cumulatively reduce sediment sources on many streams, eventually improving downstream habitat for fishes and other aquatic organisms. However, reduced sediment input may be offset by other human-caused problems as the valley population increases: continued floodplain development, industrial timber harvest, increased OHV erosion in the uplands, or road construction on private land. Riparian Reserve treatments would have no negative effect on fish. Benefits would be offset by the cumulative effects of problems elsewhere in the basin.

<u>Determination of Effects to SONC Coho salmon, SONC Coho salmon Critical Habitat, and Essential Fish Habitat (EFH)</u>
Under Alternative 2, there would not be any impacts from upland logging on coho salmon, coho critical habitat or essential fish habitat. Due to the distance of treatment areas from coho habitat; the strict fine-sediment control techniques on all proposed activities; buffering nature of all Riparian Reserves; intense scrutiny, careful design and limited acreage of Riparian Reserve treatments; protection of all possible unstable soil areas; new road location and design; and the care to mimic natural fire conditions with prescribed burning; natural ecosystem processes would be improved. No fine sediments, flow problems or other potentially harmful physical changes would negatively impact stream conditions and coho habitat.

The actions proposed in Alternative 2 were submitted to NMFS through informal consultation. BLM determined that this project is "Not Likely to Adversely Affect" Southern Oregon Northern California coho salmon, as defined by the Endangered Species Act and subsequent federal regulations. The Ferris-Bugman project was reviewed by an interagency review team of fish biologists (SW Oregon Level One Team), which agreed that the preferred alternative (Alternative 2) would not cause "take" of coho salmon or its habitat, nor adversely affect EFH. NMFS subsequently reviewed Alternative 2 of the Ferris Bugman project, as submitted, and concurred with the BLM (Letter of Concurrence dated March 14, 2002) that the proposed action would not cause "take" of coho salmon or its habitat, nor adversely affect EFH. Subsequent to the Level 1 Team's and NMFS' review, BLM made some minor changes in the proposed alternative which did not alter the determination of effects to

coho, its Critical Habitat, or EFH. BLM submitted these changes to NMFS on July 26, 2002. BLM would only reconsult if there would be different effects on SONC coho, its Critical Habitat, or EFH not already analyzed in the initial consultation.

Effects of Alternative 3 (less road construction and fewer treatment areas) on Hydrology, Riparian Reserves and Fisheries

All impacts related to hydrology, Riparian Reserves and Fisheries with the implementation of Alternative 3 would be less than what was analyzed for in the Medford District RMP (USDI 1995a), due to less intensive harvest and less road construction than was originally evaluated for. With no new road construction and somewhat reduced levels of thinning and fuels reduction treatments under Alternative 3, both the positive and negative impacts of the project would be somewhat less than Alternative 2.

Direct Effects

Streamflow and Groundwater
Stream Morphology/Stream Channels
Water Quality
Riparian Reserves/Riparian areas
Fish and Aquatic Habitat

Alternative 3 would have the same direct effects on streamflow, groundwater, stream morphology, stream channels, water quality, Riparian Reserves, riparian areas, and fish and aquatic habitat as Alternative 2, except for several intermittent stream crossings which would not be decommissioned under this alternative.

Indirect Effects

Streamflow and Groundwater

Alternative 3 would have the same indirect effects on streamflow and groundwater, except the beneficial effects of vegetation management would be reduced somewhat due to reduced acreage treated. Decommissioning of approximately 1.2 miles of an old mining road that crosses two (2) small tributaries to the Applegate River in the drainage area along the Applegate River below Ferris Gulch, above Slagle Creek (AM 0509) would not occur, because decommissioning of this road was dependent on replacing access with the ridgetop road to be constructed under Alternative 2. This road would continue contributing to increased peak flows and elevated sediment delivery to several intermittent streams from road surface erosion and runoff. The drainage this road is in (AM 0509) has a road density of approximately 9.0 miles per square mile. Density of active roads in drainage AM0509 would not decrease with implementation of Alternative 3, a negative consequence compared to the decrease of 0.2 miles per square mile as proposed under Alternative 2. This would allow direct delivery of sediment and runoff to intermittent streams and the downstream aquatic system to continue from this source.

Under Alternative 3, active road density (open, closed, and unknown roads) in the project area would decline by approximately 0.2 miles to 5.9 miles per square mile, due to the decommissioning of 5.7 miles of existing roads (Table 10). This reduction could result in a slight reduction in frequency and/or magnitude of peak flows.

Table 10. Ferris Bugman Project Area Post-project Road Density Changes - Alternative 3

Drainage Area Number [1] (see Table H-1)	Alternative 3 Miles of Road Disturbance [2] (Alternative 3 changes from existing condition [Table H-5] in parentheses)								
	Active Roads					Inactive Roads		Total miles	Total miles per square mile
	Unknown Roads	BLM Open Roads	BLM Closed Roads	Total Active Roads	Total Active Roads per square mile	BLM Decommissioned Roads	BLM Obliterated Roads		
AM 0327 AM 0330	24.3	0.2 (-0.1)	0.6 (+0.1)	**25.0**	**8.9**	0.0	0.0	**25.0**	**8.9**
AM 0333	46.6	0.3 (-4.9)	2.9 (+1.8)	**49.6 (-3.1)**	**4.4 (-0.3)**	3.1 (+3.1)	0.0	**52.7**	**4.7**
AM 0336	7.9	0.0	0.0	**7.9**	**5.7**	0.0	0.0	**7.9**	**5.7**
AM 0503	18.6	0.1	0.0	**18.7**	**6.0**	0.0	0.0	**18.7**	**6.0**
AM 0506	12.0	4.1 (-3.9)	4.0 (+1.3)	**20.1 (-2.6)**	**7.3 (-1.0)**	3.0 (+2.6)	0.3	**23.4**	**8.6**
AM 0509	45.6	1.9	0.7	**48.2**	**9.0**	0.0	0.0	**48.2**	**9.0**
AM 0512	20.1	0.6	1.3	**22.0**	**3.6**	0.0	0.0	**22.0**	**3.6**
TOTAL	**174.8**	**7.1 (-9.0)**	**9.5 (+3.3)**	**191.4 (-5.7)**	**5.9 (-0.2)**	**6.1 (+5.7)**	**0.3**	**197.8**	**6.1**

1/ Drainage areas: **AM0327**/**AM0330**-Applegate River below Keeler Creek, above Humbug Creek; **AM0333**-Humbug Creek; **AM0336**-Applegate River below Humbug Creek, above Thompson Creek; **AM0503**-Applegate River below Thompson Creek, above Ferris Gulch; **AM0506**-Ferris Gulch; **AM0509**-Applegate River below Ferris Gulch, above Slagle Creek; **AM0512**-Slagle Creek. See Table H-1 (Appendix H) for details.
2/ Slight differences in mileage from those cited elsewhere in the document are the result of source map variation and rounding error introduced by analyzing at different spatial scales. Cumulative differences are generally less than 0.1 mile. An additional 1.1 miles of previously open road to be closed are outside the project boundary and analyzed drainage areas, and are not included here.
3/ Rounding visible values to tenths resulted in some values that appear to be off by a tenth, but are in fact correct.

Stream Morphology/Stream Channels
Alternative 3 would have the same indirect effects on channel morphology as Alternative 2, except that two intermittent stream crossings along the old mine road would not be decommissioned, so flow and sediment delivery from this source would continue to negatively affect channel conditions on these streams..

Water Quality
Alternative 3 would have the same indirect effects on water quality as Alternative 2, except with no new road construction there would be no potential for sedimentation in Humbug Creek, Slagle Creek, Ferris Gulch and the unnamed tributaries of the Applegate River due to road construction.

Riparian Reserves/Riparian areas
Fish and Aquatic Habitat
Alternative 3 would have the same indirect effects as Alternative 2, except several small sections of road and two stream crossings would not be decommissioned within two intermittent stream Riparian Reserves.

Cumulative Effects
Under Alternative 3, Cumulative Effects would essentially be the same as those described under Alternative 2, except for impacts related to not constructing any new road and the reduced acreage of vegetation treatments. Reduced access from not constructing the roads would limit the ability to accomplish fuel reduction/ecological

restoration objectives on a portion of the area. With the amount of land in the project and across the watershed needing treatment, such reductions will decrease the likelihood of success for the overall project. Not building the roads would have the positive benefit of not increasing the overall amount of road-related disturbance in the project area and the watershed.

Determination of Effects to SONC Coho salmon, SONC Coho salmon Critical Habitat, and Essential Fish Habitat

When consulting with the National Marine Fisheries Service, BLM must consult on the preferred alternative of the EA. Alternative 2 is the preferred alternative; therefore Alternative 3 was not analyzed to determine effects on listed SONC coho salmon, its Critical Habitat, or EFH. If Alternative 3 is chosen, BLM will only reconsult if there could be effects on SONC coho, its Critical Habitat, or EFH not already analyzed in the initial consultation.

E. SOILS

Alternative 1 (No Action)

Direct and Indirect Effects to Soils

The effect of the no action alternative on the soil resource would be the continuance of existing erosion and sediment rates coming from the existing roads throughout the watershed. Roads would not be maintained and road drainage would not be improved. Road densities would remain at the current level and all currently opened roads would be open to traffic. This would result in no reduction of sediment production and may increase the potential for sediment delivery over time as roads deteriorate. Erosion rates would not increase as a result of timber harvest activities and prescribed fuel reduction treatments.

No density management or fuel reduction would occur. This would increase the potential for wildfire to occur in the project area. The increased fuel levels could result in a much more severe wildfire. Wildfire, even a severe fire, is a natural part of the landscape. However, severe fires have higher potential to devastate watersheds. The risk of severe fire in the watershed would continue to increase. A severe fire of any appreciable size would increase erosion and sedimentation rates dramatically. Such a fire could destroy riparian vegetation, increase sediment delivery and erosion potential, and destabilize stream channels. Negative soil impacts from a large, high intensity wildfire would be much greater and effect much more of the watershed than the proposed action.

There would be no increase in erosion rates short-term (unless a severe fire occurred) but no decrease in erosion and sedimentation rates long-term as a result of the no action alternative.

Alternative 2, Proposed Action With Transportation Management

Direct and Indirect Effects to Soils

Soils in the project area are generally stable and the landslide hazard is considered low. Areas of high landslide potential have been avoided or included in Riparian Reserves. Treated units would be scattered across the project area in a patchy network. Soil disturbance would be limited to these localized areas with only a fraction of soils within each harvest unit disturbed. There would be no widespread areas of continuous soil disturbance.

Soils and Roads

If implemented, the proposed action would:
– build approximately 5.9 miles of road,
– decommissioning about 8.0 miles of unsurfaced roads, includes 0.9 miles of temporary road,
– renovate and improve approximately 18.1 miles of existing road,
– surface about 13.4 miles of existing natural surface road,
– surface all new roads.

The proposal would decrease sediment yields by improving 25.5 miles of existing road cross drains and surface 13.4 miles of existing roads. The affects of 6.8 miles of new road construction would be partially balanced by decommissioning 7.1 miles of existing unsurfaced roads. Mechanically decommissioning roads would decrease sediment yields to near natural rates within ten years. There would be a moderate short-term increase in sediments yielded to local streams the first few rain events after road work is completed. This would be particularly evident if all of the road work is accomplished the first year of the contract which is usually the case. A long-term decrease in sediment production associated with existing roads would result as erosion rates on decommissioned roads lower to near natural levels. The surfacing of about 13.4 miles of existing unsurfaced roads would further reduce sediments reaching the aquatic environment.

There would be a short-term increase in soil movement along temporary spur roads, skid trails, and on cable yarding corridors before disturbed soils stabilize. However, locating temporary roads on or near ridges, water barring skid trails, and filtering by vegetation in Riparian Reserves would reduce or prevent sediment from reaching streams.

New roads would have an impact on the soil resource. Approximately four (4) acres of land is disturbed and taken out of vegetation production for every one mile of road proposed. The 5.9 miles of new construction would take out of production approximately 24 acres. Conversely the decommissioning of 7.1 miles of existing unsurfaced roads would bring back into production approximately 29 acres.

In addition to treating the slash on the harvested sites, the proposed action would conduct prescribed fuel treatments on approximately 1,537 acres of grass/brush fields and oak woodlands that currently have high amounts of natural fuels.

Road renovation, maintenance and drainage improvement, as well as log hauling could cause a short term increase in fine sediments. Road renovation, maintenance, and drainage improvement is intended to reduce actual and potential erosion, potential road failure, and the resulting stream sedimentation. During road work, sediment control measures would be used to minimize or prevent sediment delivery to streams. Overall, there would be a long-term decrease (improvement) in stream sedimentation rates within the project area due to less roads (in high road density areas), improved road drainage, and renovated existing roads.

The closing of roads with gates and barricades would help reduce sediment input by restricting traffic use on those roads. This is especially important during the winter season when erosion potential and sediment production is highest, and would be greatly increased by road traffic. Therefore, closing these roads would result in a long-term decrease in sediment production.

There would be a short term increase in soil movement along temporary spur roads, skid trails, and on cable yarding corridors before disturbed soils stabilize. However, locating temporary roads on or near ridges, decommissioning temporary roads, seeding, mulching, and water barring skid trails, and establishing Riparian Reserves would reduce or prevent sediment from reaching streams.

The proposed action would have no negative effect on the water quality of the Applegate River (a 303(d) listed water body) or other stream systems in the project area due to the implementation of Riparian Reserves, project design features, and best management practices. The reduction in sediment delivery through road improvements and decommissioning would cause an overall reduction in stream sediment levels. The establishment of Riparian Reserves would protect riparian vegetation which provides stream shading. However, this alternative would probably have no impact on water temperatures in the Applegate River.

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Soil compaction may result in a slight increase in surface runoff within individual harvest units. The spatial scattering of harvest units across the landscape would limit the effects of compaction to these localized areas.

This spatial separation of harvest units and the existence of Riparian Reserves would help to capture and reduce potential runoff and filter any sediment it may be carrying.

OHV Use

OHV include motorcycles, all terrain vehicles (ATVs), and 4WD vehicles that are driven off existing roads. Users of OHV form their own roads and trails by repetitive use that wears down the surface cover. Rutting is common and may form channels where water can flow. Erosion is in two forms: mechanical detachment and concentrated flow of surface water (Maurer and Glover 1995). OHV induced erosion has been observed in the project area. The closing of OHV use on the proposed new roads, decommissioned roads, and closed roads would limit the area available for OHV use and decrease the erosion and sediment production. The new roads only cross dry draws, well away from any active streams.

Soils and Thinning Activities

The proposed action is to thin commercial timber from approximately 1,856 acres of federal land. The commercial thinning activities planned would impact less than 10 percent of the planning area and approximately 4% of the Middle Applegate Watershed.

Less than 130 acres would be tractor logged using designated skid trails. A maximum of 1,385 acres would be skyline-cable logged using partial suspension, and a maximum of 1,657 acres would be yarded off-site with a helicopter. The discrepancy in total acres results from multiple yarding methods used on the same units.

Erosion rates would be higher in the tractor units where the soil is disturbed and lower in the cable and helicopter units. Although erosion rates would increase, most soil particles would remain on-site and soil particles reaching the waterways would increase slightly over the first few years after harvests then return to near normal rates. See Hydrology section for more information on sedimentation.

Slash created by the logging would be treated to reduce the total fuel loading on-site.

All tractor yarding would be accomplished using designated skid trails resulting in the compaction of no greater than 12 percent of the unit (Froehlich 1981).

Cable and helicopter yarding would result in less soil disturbance. Cable yarding subjects up to seven (7) percent of the unit to severe disturbance (Smith 1979). Helicopter yarding would subject about one (1) percent of the unit to severe disturbance (Klock 1975).

If the most impacting method of yarding was used on every acre of the harvest units, the calculated amount of soil compaction would be 153 acres or eight (8) percent of the total treatment area. New road construction would compact an additional 27 acres with helicopter landings and temporary spur roads adding about 14 acres. The combined acres would result in the compaction of about 2% of the Ferris Bugman project area and 0.22% of the Middle Applegate 5th field watershed. This is the maximum amount of compaction that would occur. It is unlikely that there would be any noticeable effect from this small amount of disturbance.

Soils and Fuel Reduction

The proposed action is to reduce fuels on approximately 1537 acres of federal land (Table A-4, Appendix A).

A array of tools would be used to reduce fuel loads, these include: broadcast burn, underburn and manual treatment. As detailed in Chapter II (under Fuel Treatment), when conditions are right manual treatment can include the use of the Slashbuster.

Broadcast and underburns associated with the fuel treatments would have a moderate effect on the soil. Burning increases the amount of mineral soil exposed by a varying amount, depending on the depth and consumption of the forest floor. Burning can expose up to forty percent of the burned area. A low- intensity burn would have little direct effect on soil properties. A light surface fire would generally char the litter, leaving most of the mineral soil partially covered.

The desired result is a mosaic of burn intensities, where unburned or lightly burned areas may lie adjacent to more severely burned strips. The retention of duff is desired, where duff already exists. The goal is to burn a majority of litter with a retention of as much duff as possible. It is acknowledged that there might be pockets where a majority of duff is consumed. This is acceptable as long as a mosaic of severity is present, allowing migration of soil organisms from adjacent areas to recolonize impacted sites

Most soil movement occurs during the first season after the slash is burned and quickly diminishes as vegetation cover re-establishes. Soil productivity would experience a slight negative decrease short-term but long-term positive effects would be realized from the proposed actions as the risk of severe fire is diminished.

Piled slash burns hotter than broadcast burning, increasing consumption of organic matter and nutrient losses. High soil temperatures generated under burning piles (typically, about 3-5% of the harvested area) negatively affect soil properties by physically changing soil texture, structure and reducing nutrient content. Additionally, the intense teat resulting from burning of hand piles would negatively impact soil organisms for the short-term. Migration of soil organisms from adjacent areas would recolonize these sites.

A reduction in vegetation density as planned for in this project would mitigate compaction and help to attain the development of late-successional species and structure.

Site productivity would be enhanced by reducing the potential for severe wildfires. An uncontrolled burn could be of such intensity so as to severely increase erosion and sedimentation, and also severely set back the community of microorganisms. For this reason, proposed fuel treatments are considered to have a net positive influence on soil resources.

A short-term increase in available nutrients released by burning would benefit newly released vegetation, both tree and browse species.

There would be a short-term increase in available mineral nutrients such as calcium and magnesium, conversely, there would be a temporary decrease in total site nitrogen, yet available nitrogen would be increased.

The cumulative effects to the soil resource in the affected landscape area would be a moderate short-term increase in erosion rates which would last about three to five years. A slight long-term decrease in erosion rates would occur as the affected harvest units re-establishes ground cover, land that was once occupied by roads are put back into producing vegetation (ground cover), and the risk of severe wildfire is reduced. The watersheds would continue to experience high erosion rates long-term as a result of the high road density per square miles.

Alternative 3

Direct and Indirect Effects to Soils

The effects on the soil resource would be similar to those of Alternative 2.

Differences would be:
– There would be no increase in erosion and sedimentation as a result of building new roads.

– Without extension of road 37-4-22 there would be no prescribed fuels reduction on Units N1, N2, N3 and N4, and the risk of severe fire in the watershed would continue to increase.
– Cumulative effects to the soil resource in the Middle Applegate Watershed would be slightly less than Alternative 2, unless a severe fire occurred in the Humbug drainage which would increase erosion rates.
– Overall, the erosion rates would remain high long-term as a result of high road densities and moderate-to-slight erosion rates as a result of harvesting timber and prescribed burning.

F. DENSE STANDS/FOREST HEALTH

Direct, Indirect, and Cumulative Effects of Alternative 1 (No Action)

With no action, forest stands would remain overstocked and individual tree vigor and growth would remain poor. The average dominant tree 10-year radial growth is 0.45 inches or 0.90 inches diameter growth per decade in the Appleseed project area. During 1997 an 18 tree sample of dominant trees in the Ferris Bugman project area showed an average radial growth per decade of 0.4 inches. Dominant tree 10-year radial growth ranged from 0.1 to 0.95 inches. When radial growth is less than 0.5 inches per decade, pine trees cannot pitch-out bark beetles and tree mortality results (Dolph, 1985). Tree mortality represents a reduction in stand volume production and a loss of revenue and poor forest health.

Without action, forest structure and species composition could not be controlled. On pine sites, Douglas-fir would remain the most prevalent species and stands would remain in the stem exclusion stage of development if mortality does not occur. Old-growth ponderosa pine and Douglas-fir trees with seedlings through poles within their dripline would continue to die from competition for water. Pine species would continue to decline in number from competition with Douglas-fir because of their shade intolerance. Leaf area index may decline as live tree crowns decrease in size from tree competition. With large tree mortality, forest stand structure would gradually shift to the understory reinitiation stage.

No action contradicts the Medford District Resource Management Plan forest condition objectives in regard to forest health. The plan states that management emphasis be placed on treatments and harvests that restore stand conditions and ecosystem productivity.

Cumulative Effects

With no forest stand density reduction, slow tree growth and vigor would result in individual tree and perhaps stand mortality. If severe stand mortality results, silvicultural options in the future would be reduced. It is possible that after bark beetle attack, there may be less than 16 trees per acre remaining in some forest stands. If this happens we would not be able to harvest live trees for approximately 30 to 50 years and spotted owl habitat would be degraded. Hardwood tree, shrub and forb species would become more abundant and provide forage and hiding cover for big game animals. Song bird habitat would be enhanced also.

Pine species would continue to decrease in number if large openings are not created for these shade intolerant species. The more shade tolerant Douglas-fir would continue to dominate the forest.

Where dense forest stands persist overtime, canopy closure would remain at 90 to 100%. When tree mortality is singular or in small patches, canopy closure would be approximately 50 to 80%. Where large patches of trees die, canopy closure would be 0 to 40%.

Fire hazard would increase with the abundance of dead vegetation and ladder fuels.

Direct, Indirect and Cumulative Effects of Alternative 2, Proposed Action with Transportation Management

The proposed prescriptions (located in EA file) to be applied across the forest landscape are based upon the present vegetation structure, species composition, aspect, and vegetation condition class. The prescriptions would allow for the creation of desired old-growth forest structure and the desired tree series over time. Trees would then be vigorous enough to withstand bark beetle attacks. Leaf area index values would begin to increase after the stands are thinned. With the group selection prescription, pine species would be favored to increase their prevalence in the forest stands. Through forest stand treatments, tree densities are reduced, thus allowing for improved individual tree vigor and growth, and improved forest health. The various prescriptions meet the specifications of restoration thinning and density management as outlined in the Medford District Resource Management Plan.

In addition to the commercial treatment, 360 acres would be precommercially thinned. There are 28 Operations Inventory units (see Appendix A), or portions of units, that are in need of precommercial thinning. The excess, small diameter trees less than 8 inches DBH would be cut from under the drip lines of old-growth trees to increase survival. Elsewhere the excess tree stems would be thinned to a desired stocking level to improve the growth and vigor of the remaining trees. Achieving the desired species composition goals is of equal importance.

Cumulative Effects

By utilizing various landscape prescriptions, future silvicultural options would be greater. The majority of forest stands to be commercially thinned could be commercially thinned once again, or regeneration harvested in 10 to 40 years. Pole sized stands could be entered in 30 to 60 years. The prescriptions would also assume that drought resistant conifer species such as ponderosa pine and incense cedar would be present in future stands where appropriate in regard to site conditions. This is critical to forest health. Tree species would be favored on sites where they are best adapted.

There is a wide variety of silvicultural prescriptions because of the wide variety of present day forest stand structure. A variety of prescriptions are needed to create future old-growth forest stand structure. Approximately 86 acres of moist Douglas-fir, 420 acres of pine series forest, 1,019 acres of dry Douglas-fir forest, 39 acres of poles, 118 acres of wildlife connectivity corridors, and 174 acres of Douglas-fir regeneration harvest area would be treated. As the aspect and microclimate change within a forest stand, the tree plant association usually changes. There may be pine trees within a dry Douglas-fir forest that may need releasing according to the pine prescriptions. Within the pine series forest patches of Douglas-fir may be encountered that would be treated according to the dry, Douglas-fir prescription. Forest stands would vary and the tree plant associations would be treated by the respective prescriptions. There is within stand variation in canopy closure and this variation would remain across the landscape. On Douglas-fir sites, including pole stands, canopy closure would be 50 % or greater. On pine and Douglas-fir regeneration harvest sites, canopy closure would be 20 to 40 %. Pine species are shade intolerant so canopy closure must be lower. Wildlife connectivity corridors would have 60% canopy closure or greater.

Precommercial thinning would be performed on 360 acres to achieve species composition goals and to improve the growth and vigor of the younger trees. Precommercial thinning would also help to reduce the fire hazard.

If surrounding private lands are clearcut, our forest stands would be the only patches of forest left to provide late-successional habitat. Surrounding BLM administered lands would be managed with similar prescriptions to assure forest health.

Direct, Indirect and Cumulative Effects of Alternative 3, Proposed Action With No Transportation Management

The no new roads alternative would eliminate vegetation management on 661 acres of forest land (36% reduction from the Variable Prescription alternative). The effects on this 661 acres would be the same as the No Action alternative. Forest health would remain poor as well as individual tree vigor. Precommercial vegetation management would be eliminated in 16 Operations Inventory units (Units 127282, 127284, 157436, 157441,

157445, 157450, 157452, 157453, 157463, 157842, 157850, 157851, 157858, 157868, 158426, and 158448) or approximately 230 acres (a 64% reduction in precommercial management). Precommercial thinning would only occur in 12 Operations Inventory units or 130 acres (Units 156601, 156614, 156647, 157344, 157369, 157370, 157374, 157833, 157986, 158012, 158322, and 158430) if no new roads are built.

A 36% reduction in commercial vegetation management and a 64 % reduction in precommercial management would result across the landscape. This could cancel out the effects of BLM's vegetation treatments elsewhere in the project area. Cumulative effects in the no treatment areas would be the same as in the No Action alternative.

G. FUELS

A detailed fuels report is listed in the appendix for additional supporting data.

Fuels management activities generate particulate pollutants in the process of treating fuels. Smoke from prescribed fire has the potential to effect air quality within the project area as well as the surrounding area. The use of prescribed fire for ecosystem restoration can produce enough fine particulate matter to be a public health and/or welfare concern. Fine particulates in smoke can travel many miles downwind impacting air quality in local communities, causing a safety hazard on public roads, impairing visibility in class I areas, and/or causing a general nuisance to the public. If properly managed, most negative effects of prescribed fire smoke can be minimized or eliminated.

Prescribed burning does emit some carbon monoxide (CO), from 20 to 500 lb. per ton of fuel consumed. This would be a concern if there were other persistent large CO sources in the immediate vicinity. CO is such a reactive pollutant, however, that its impact is quickly dissipated by oxidation to carbon dioxide where emissions are moderate and irregular and there is no atmospheric confinement.

Burning also emits moderate amounts of volatile organic compounds (VOC) and minor amounts of nitrogen oxides (NOx). These are precursors to formation of ground level ozone. Here, fire-related emissions may be seen as important only when other persistent and much larger pollution sources already cause substantial nonattainment of NAAQS.

Particulate matter smaller than 10 micrometers (PM 10) is a term used to describe airborne solid and liquid particles. Because of its small size, PM 10 readily lodges in the lungs, thus increasing levels of respiratory infections, cardiac disease, bronchitis, asthma, pneumonia, and emphysema.

The fate of PM emissions from prescribed burning is twofold. Most (usually more than 60%) of the emissions are 'lifted" by convection into the atmosphere where they are dissipated by horizontal and downward dispersion. The "unlifted" balance of the emissions (less than 40%) remain in intermittent contact with the ground. This impact is dissipated by dispersion, surface wind turbulence and particle deposition on vegetation and the ground. The risk of impact on the human environment differs between the two portions of smoke plume.

Smoke Aloft

Until recent decades, the impact of the lifted portion of smoke was ignored because it seemed to "just go away." These impacts are generally not realized until the mechanisms of dispersal bring the dispersed smoke back to ground level. Because the smoke has already dispersed over a broad area, the intensity of ground-level exposure is minimal. The duration of exposure may include the better part of a day, however, and the area of exposure may be large.

Ground Level Smoke

Unlike smoke aloft, the potential for ground level smoke to create a nuisance is immediate. This part of the smoke plume does not have enough heat to rise into the atmosphere. It stays in intermittent contact with the human environment and turbulent surface winds move it erratically. Also in comparison to smoke aloft, human exposure is more intense, relatively brief (a few hours) and limited to a smaller area. Smoke aloft is already

dispersed before it returns to the human environment while ground level smoke must dissipate within that environment. Dissipation of ground level smoke is accomplished through dispersion and deposition of smoke particles on vegetation, soil and other objects.

Non-attainment Areas

The population centers of Grants Pass, Medford/Ashland (including Central Point and Eagle Point), and Klamath Falls in the past were in violation of the national ambient air quality standards for PM 10 and are classified as nonattainment for this pollutant. The nonattainment status of these communities is not attributable to prescribed burning. Major sources of particulate matter within the Medford/Ashland nonattainment area is smoke from woodstoves and dust and industrial sources. The contribution to the nonattainment status of particulate matter from prescribed burning is less than 4% of the annual total for the Medford/Ashland air quality management area. Over the past seven years the population centers of Grants Pass and Medford/Ashland have been in compliance for the national ambient air quality standards for PM 10.

The pollutant most associated with the Medford District's resource management activities is PM 10 found in smoke produced by prescribed fire. Monitoring in southwest Oregon consists of nephelometers (instrument designed to measure changes in visibility) in Grants Pass, Provolt, Illinois Valley, Ruch and eventually in Shady Cove. One medium volume sampler is collocated with the nephelometer at the Provolt site. The medium volume sampler measures the amount of PM 10 and smaller at ground level.

ORS468A.005 through 468A.085 provides the authority to DEQ to establish air quality standards including emission standards for the entire State or an area of the State. Under this authority the State Forester coordinates the administration and operation of the plan. The Forester also issues additional restrictions on prescribed burning in situations where air quality of the entire State or part thereof is, or would likely become adversely affected by smoke.

The proposed action and no road alternative both propose to use prescribed fire so consequently there would be some smoke related impacts.

Under these alternatives, prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan (OSMP) and the Visibility Protection Plan. Prescribed burning under alternatives I and II is not expected to effect visibility within the Crater Lake National and neighboring wilderness smoke sensitive Class I areas (Kalmiopsis and Mountain Lakes) during the visibility protection period (July 1 to September 15). Prescribed burning is not routinely conducted during this period primarily due to the risk of an escape wildfire.

Prescribed burning emissions, under these alternatives is not expected to adversely effect annual PM10 attainment within the Grants Pass, Klamath Falls, and Medford/Ashland non-attainment areas. Any smoke intrusions into these areas from prescribed burning are anticipated to be light and of short duration.

The greatest potential for impacts from smoke intrusions is from underburning to localized drainages within and adjacent to the project area. Underburning requires a low intensity burn that would not have the energy to lift the smoke away from the project site. Smoke retained on site could be transported into portions of non-attainment areas if it is not dispersed and diluted by anticipated weather conditions. Localized concentration of smoke in rural areas away from non-attainment areas may continue to occur during prescribed burning operations.

Prescribed burning would be scheduled primarily during the period starting in January and ending in June. This treatment period minimizes the amount of smoke emissions by burning when duff and dead woody fuel have the highest moisture content, which reduces the amount of material actually burned. Smoke dispersal is easier to achieve due to the general weather conditions that occur at this time of year.

Other measures to reduce the potential level of smoke emissions from proposed burn sites would include mop-up to be completed as soon as practical after the fire and covering hand piles to permit burning during the rainy season where there is a stronger possibility of atmospheric mixing and/or scrubbing. The use of aerial ignition (helicopters) in broadcast burn units reduces the total emissions by accelerating the ignition period and reducing the total combustion process due to the reduction in the smoldering stage.

Since 1995 fuel hazard reduction work has occurred in the Middle Applegate Watershed. To date three landscape projects within this watershed have been implemented. These projects are the Lower and Middle Thompson Creek projects and the Forest Creek project. Along with these projects a small amount of acreage has been treated in the Appleseed project area which includes the Ferris Bugman project area. To date approximately 7,414 acres have been treated within the Middle Applegate Watershed. Of these acres 2,316 have been on non-commercial timber land. Treatments include manual, mechanical and prescribed burning. The following table displays the acres treated to date:

Acres of each vegetation management type treated for fuel hazard reduction in the Middle Applegate Watershed, as of January 1, 2002

Unit Type	Total Acres
Shrubland	443
Shrubland/Grassland	310
Density Management	2,201
Fuel Break /Shrubland	20
Fuel Break Timber	483
Fuel Break / Shrubland	181
Grassland	241
PCT/Natural stands	1,996
PCT/plantation	26
Woodland	1,121

In addition to these acres approximately 4,400 acres are under contract to be treated in this watershed.

Breakdown of acres to be treated:

3,150 acres in the Forest Creek timber sales
132 acres of non-commercial land (slashbuster and manual)
580 acres Spencer Lomas Area
500 acres in the Lower and Middle Thompson Creek projects

Future landscape projects are planned over the next five years in the Middle Applegate Watershed. These areas include the China Gulch area, Chapman-Keeler area and the upper Thompson Creek drainage.

Direct and Indirect Effects of Alternative 1 (No Action)

The current trend of increasing stand density which results in increased mortality to the timbered stands would continue. Ladder and surface fuels would also increase within the stands. Increasing stand densities and fuel

loadings would increase the chance of more acres that would burn in high intensity fires within the project area. Fire fighter safety would continue to be an issue as well as the potential of resource damage.

The objectives of improving grasslands would not be achieved. Also, the restoration of shrublands and Oak woodlands would not be achieved.

Air quality would be impacted in the event of a large wildfire. Emissions from wildfires are significantly higher than from prescribed burning. The wildfires which occurred in southern Oregon in 1987 emitted as much particulate matter as all the burning that occurred within the state that year.

Direct and Indirect Effects of Alternative 2, Proposed Action with Transportation Management
The existing surface fire behavior fuel model in the majority of stands proposed for commercial thinning are represented by a Timber Group fire behavior fuel model. In the short term (10-25 years) commercial thinning would create surface fuels which would be greater in most areas than current levels if they are not treated. Fuel amounts are measured in tons per acre for different size material. Material up to 3 inches in diameter has the greatest influence on the rate of spread and flame length of a fire, which has direct impacts on fire suppression efforts. It is anticipated that fuel loadings after logging would be increased by approximately 3-15 tons to the acre. This would change the existing fuel model of most of the timbered stands to a Logging Slash Group which in turn would create higher rates of spread and greater flame lengths in the event of a wildfire. Direct attack of a fire would be limited under some weather conditions so indirect measures would have to be taken. This would in turn increase the size and cost of a wildfire.
Slash created from thinnings, if not treated, would also increase the duration and intensity of a ground fire. Increased fire intensity and duration would cause increased mortality to the smaller diameter overstory trees.

To mitigate the impacts that slash created from these thinnings would have on fire behavior, the slash would be treated on the majority of units proposed for harvest under this project. The proposed commercial thinning would reduce the overall density of the stands treated. These thinnings would reduce some of the aerial fuels present in the stands. Some of the smaller diameter trees that are of commercial size which are proposed for harvest also act as ladder fuels. The combination of removing some of the aerial component as well as the ladder fuels would reduce the chance of sustaining a crown fire in these stands. Over time the commercial thinning would also increase diameter growth of the residual stand. Larger diameter trees are more tolerant to surface fires so there would be less mortality to the stand in the event of a surface fire. The commercial thinnings would also favor more fire tolerant species such as pine.

Treatment of noncommercial size material is also proposed for stands that are commercially thinned. By treating this material the ladder and surface fuels in these stands would be reduced. The reduction of this material would reduce fire behavior such as flame length and fire duration. With the reduction of flame length and fire duration the chance of a crown fire initiating in these stands would be greatly reduced. Also, mortality of the smaller diameter conifers would be reduced. The reduction of flame length would also increase the chance that direct attack of a wildfire could occur which would reduce acres burned in the event of a wildfire.

The objectives of improving grasslands and the restoration of shrublands and Oak woodlands would be achieved under these alternatives. The high fire hazard which exist in these areas would also be greatly reduced.

Impacts of Spring versus Fall Burning
The season in which underburning is implemented is based on achieving hazard reduction objectives while minimizing impacts to the site. Fall underburning is utilized when fuel levels are low enough to allow for a low intensity burn which was historically common in these fire regimes. Due to the long absence of fire, fuel levels in most cases are too high to initially burn a unit in the fall.

The surface fuel loading in a unit dictates fire intensity. A common method to reduce fuel loadings before underburning is implemented is to use manual treatment (slashing, hand piling and burning). Even after manual treatments surface fuel levels in the 1, 10 and 100 hour fuels (1/4" to 3") are often high so that a low intensity burn is not possible. When this is the case underburning is done in the spring.

Burning in the fall with high surface fuel loadings would have adverse impacts to numerous resources due to fires being of higher intensity. Large down woody debris consumption is higher in the fall. Duff consumption is higher and soil heating tends to be higher. Mortality to the residual stand as well as other vegetation is higher due to higher intensity fires low live fuel moisture. Snag retention is difficult due to the low dead fuel moistures and higher fire intensity.
With higher fire intensities and lower live and dead fuel moistures the risk of escape is greatly increased.

Prescriptions are developed for spring burning to consume the smaller fuels (1/4" - 3") and retain the majority of large down woody debris due to the higher dead fuel moistures. Soil moisture is also higher in the spring so duff consumption is also minimal. Burning under these conditions keep fire intensity low so impacts to residual vegetation is minimal and the chance of escape is also minimized. Visual observations of areas that have been underburned in the spring in the Applegate over the past six years have not shown any negative impacts to the site.

Other activities associated with underburning such as fireline construction and mop-up operations after the burn have minimal impacts to the site. Firelines are 1 to 2 feet in width and are waterbarred to minimize soil erosion. Re-growth of vegetation on the firelines normally occur within one growing season. Mop-up operations are normally limited to a 100 foot perimeter around a burned unit. Soil disturbance is scattered in localized areas within this perimeter.

Direct and Indirect of Alternative 3, Proposed Action, with No Transportation Management
Access to an area plays a critical role in determining if fuels treatments can occur. The risk of escape is a major factor when conducting burning operations especially underburning and broadcast burning. Without access there is an increase risk of escape due to the lack of availability and mobility of people, equipment and water. Limited or no access would preclude the use of prescribed burning. Under this alternative the road for construction along the major ridge line that separates the Slagle creek drainage and Humbug Creek drainage would not be built. Due to no access into this area the non-commercial units N1, N2, N3, N4, and N5 would not be treated. In addition approximately 661 acres of commercial timber land would also not be treated. Not treating the fuels along this ridge line greatly reduces its effectiveness for use as a control point in the event of a wildfire. Other objectives for treating these units would also not be meet.

The construction of the roads would increases response time of suppression forces to this area in the event of a wildfire. Quick response time is a major factor in insuring wildfires are kept small in size.

H. WILDLIFE IMPACT ANALYSIS

Alternative I - No Action

Direct, Indirect, and Cumulative Effects

No projects are planned under this alternative. Therefore, disturbances and vegetative succession would occur naturally (except for fire suppression). Wildlife populations and distributions would change in response to these processes. Exclusion of natural fire regimes across the landscape would continue the trend toward loss of some plant communities within open pine, oak woodlands, and grasslands. Under this alternative, fire hazard would continue to increase, which increases the risk of a large catastrophic fire. A large scale loss of mature forests would result in adverse effects to those wildlife species that are associated with that habitat.

Action Alternative II - Variable Prescriptions with Proposed Road Construction

Direct Effects

The general effects of timber harvest and fire management activities on wildlife/wildlife habitat are discussed in the Medford District Final Environmental Impact Statement (Chapter 4, pages 51-65 and other portions). The effects that are more site/drainage area specific are addressed further in the discussion on Direct Effects in the Wildlife Appendix.

New Road Construction. Alternative II would treat 663 more acres than Alternative III due to increased logging access from new road construction.

The primary concems with new road construction in relation to wildlife are: 1) vehicle and human disturbance; 2) fragmentation of habitat for certain species; 3) increased loss of habitat; and 4) altered wildlife behavioral patterns and habitat use. The benefits to wildlife of the density thinning treatments would be the reduction of fire hazard and the improvement of forest health, including the encouragement of large tree growth.

Based on removal of approximately 4 acres of vegetation per mile, Alternative II would eliminate approximately 27 acres (short-term impact; temporary and permanent roads) or 24 acres (long-term impact; permanent roads) of the various habitat types present in the project area. However, given the scale of the project the quantity of habitat loss would be negligible. The greater impact of the road construction on wildlife would be associated with the long-term vehicular and human disturbance that could occur. In this project, newly constructed roads will be blocked with gates and would be closed to OHV. Gates and other road barriers are sometimes vandalized or circumvented and roads may not remain blocked. Based on past experience, BLM gates receive the most vandalism when an existing road is blocked that has been used historically by the public. There is less likelihood of vandalism when newly constructed roads are blocked.

Even if the blocks/gates keep full sized vehicles out, off-highway vehicles (OHV) and motorcycles could illegally use it to access ridge tops and develop links to existing trails in the area. Wildlife in general are sensitive to vehicular disturbance and harassment. The cumulative effect of many roads across the landscape is that habitat becomes fragmented and this is detrimental to wildlife. Habitat within varying distances of roads is not used by wildlife to the extent it would be if the roads were not present.

Threatened/Endangered Species: *Northern Spotted Owl*

The northern spotted owl is listed as a threatened species under the auspices of the Endangered Species Act of 1973, as amended. Due to habitat modification that would occur under Alternatives II and III, BLM is required to formally consult with the U.S. Fish and Wildlife Service because the proposed actions would adversely affect northern spotted owls.

Alternative II would modify approximately 952 acres of suitable northern spotted owl habitat (i.e., nesting/roosting/foraging habitat) and 523 acres of dispersal habitat. Approximately 952 acres of the suitable habitat would be rendered unsuitable. Of this total, approximately 647 acres would be commercially thinned and is expected to again provide suitable habitat in 10-30 years if it remains unharvested for this period of time. In the interim, these acres would provide dispersal habitat. The remaining acres would be Pine, shaded fuel break, or regeneration treatments. Approximately 305 acres of suitable habitat with these prescriptions would provide neither suitable nor dispersal habitat in the long-term.

Approximately 310 acres of dispersal habitat to be harvested by the thinning prescriptions would retain dispersal habitat function after the harvest. Approximately 213 acres of dispersal habitat with Pine or regeneration prescriptions would be lost as dispersal habitat in the long-term.

Effects of Alternative II on Northern Spotted Owl Suitable Habitat

Existing Suitable habitat	Amount Suitable Treated	Loss of Suitable Habitat	Amt. Treated which Becomes Dispersal Habitat	Amt. Treated Loss as Suitable or Dispersal
1,903 ac.	952 ac. (50%)	952 ac. (50%)	647 ac. (34%)	305 ac. (16%)

Existing Dispersal Habitat	Amount Dispersal Treated	Amt. Treated Remains Dispersal Habitat	Loss of Dispersal Habitat
1,992 ac.	523 ac. (26%)	310 ac. (15%)	213 ac. (11%)

The habitat loss described above is expected to adversely affect the ability of spotted owls within and adjacent (within 1.3 miles) to the project area to successfully reproduce and would result in the "incidental take" of these owls. Formal consultation for the northern spotted owl with the U.S. Fish and Wildlife Service (USFWS), has been completed for timber sales in the project area that would be sold in fiscal years 2001-2003 [Biological Opinion 1-7-01-F-032 (BO)]. The mandatory terms and conditions of the BO require the implementation of project design criteria proposed in the Biological Assessment for the BLM, Rogue River and Siskiyou National Forests (BA). These criteria are included as Project Design Features in Chapter II.

Special Status Species
For purposes of management action concerns, species are recognized as "special status" if they are federally listed as Threatened or Endangered, proposed for federal listing as Threatened or Endangered, or if they are a BLM sensitive or assessment species. BLM policy is to manage for the conservation of these species and their habitat so as not to contribute to the need to list and to recover these species (Special Status Species Policy for Oregon and Washington, 1991).

Alternatives II and III would (adversely) affect some special status species in both the short- and the long-term, due to the overall change in stand structure, specifically the reduction in canopy closure and snags. Those species which are likely to be most affected by the reduction in canopy closure are northern spotted owl, northern goshawk, and great gray owl. Species that would be most affected by the reduction in snags within the forested matrix are the woodpeckers and bats. The RMP (USDI 1995a) and the SEIS provide some degree of site specific mitigation for these species. Impacts to woodpeckers and bat species would be mitigated by the retention of most snags. Impacts to northern spotted owls and great gray owls would be mitigated by the retention of designated core areas around nest sites/activity centers. Riparian Reserves within the project would help provide corridors of late-successional forests between owl cores.

Survey and Manage Species

Great gray owl: Nesting habitat for this species is typically mature/old-growth forest which is adjacent to meadows or clear-cuts used for foraging habitat. To date, one great gray owl nest site has been located in the project. All nest sites found prior to the sale date would each receive approximately 125 acre protection zones, in accordance with SEIS and RMP (USDI 1995a) guidelines.

Mollusks: No survey and manage mollusks have been found in the project area. Any Survey and Manage mollusk species which are located would receive protection as outlined in the Management Recommendations for Survey and Manage Terrestrial Mollusks, version 2.0, dated Oct., 1999.

Indirect Effects
Indirect effects associated with the proposed project, such as site preparation or planting, would have only minor impacts on wildlife because these actions would occur in areas already disturbed by the major actions (i.e., timber harvest or brushland/oak-woodland treatment).

Alternative III - Variable Prescriptions with No New Road Construction
Direct Effects
The general effects of timber harvest and fire management activities on wildlife/wildlife habitat are discussed in the Medford District Final Environmental Impact Statement (Chapter 4, pages 51-65 and other portions). The effects that are more site/drainage area specific are addressed further in the discussion on Direct Effects in the Wildlife Appendix.

Threatened/Endangered Species: Northern Spotted Owl
Without new road construction, several treatment areas would be dropped due to lack of access. This would result in dropping 633 acres from the planned treatments. The amount of suitable spotted owl habitat loss would be reduced by approximately 432 acres. The total suitable habitat loss in the project area for Alternative III would be 520 acres (27%), in contrast to 952 acres (50%) under Alternative II.

Alternative III would limit disturbance to nearby owl cores caused by the additional people, vehicles, OHV, and trail bikes associated with increased access to the forest from roads. Roads reduce and fragment wildlife habitat, causing a detrimental cumulative effect as more are added. Fragmentation adversely affects wildlife species such as the spotted owl which are dependent on late successional habitat.

The trade-off that would result from dropping 633 acres (Alternative II verses Alternative III) of treatment from the project, is that fire hazard would remain high, and forest health would not be improved through treatments in those areas. One objective of density thinning is to encourage the growth of large trees, which would result in a long-term benefit to late-successional wildlife species.

Effects of Alternative III on Northern Spotted Owl Suitable Habitat

Effects of Alternative III on Northern Spotted Owl Suitable Habitat				
Existing Suitable habitat	**Amount Suitable Treated**	**Loss of Suitable Habitat**	**Amt. Treated which Becomes Dispersal Habitat**	**Amt. Loss as Suitable or Dispersal**
1,903 ac.	520 ac. (27%)	520 ac. (27%)	318 ac. (16%)	202 ac. (11%)
Existing Dispersal Habitat	**Amount Dispersal Treated**	**Amt. Treated Remains Dispersal Habitat**	**Loss of Dispersal Habitat**	
1,992 ac.	344 ac. (17%)	228 ac. (11%)	116 ac. (6%)	

Special Status Species

Alternative III would limit disturbance to wildlife caused by the additional people, vehicles, OHV, and trail bikes associated with increased access to the forest from roads. Roads reduce and fragment wildlife habitat, causing a detrimental cumulative effect as more are added. Fragmentation adversely affects special status species such as the spotted owl, great gray owl, and goshawk which are dependent on late successional habitat.

The trade-off that would result from dropping 633 acres of treatment from the project, is that fire hazard would remain high, and forest health would not be improved through treatments in those areas. Under this Alternative, there would be a loss to late-successional wildlife species of the benefit of encouragement of large tree growth that would result from the thinning treatments.

Survey and Manage Species
The mitigating measures, project design features, and surveys for Survey and Manage species referred to in Alternative II, would also apply to Alternative III.

Indirect Effects
Indirect effects associated with the proposed project, such as site preparation or planting, would have negligible impacts on wildlife, and the project design features would further minimize any of these impacts.

Cumulative Effects Wildlife - Ferris-Bugman EA
Cumulative effects are defined as the collective environmental impacts of all past, present, and reasonably foreseeable future actions taking place in the affected area. A discussion of cumulative effects in relation to wildlife is included in the Wildlife Appendix.

I. BOTANY IMPACT ANALYSIS
Direct, Indirect, and Cumulative Effects of Alternative 1 (No Action Alternative)
The no action alternative would have no direct affect on the continued persistence of the Federally listed *Fritillaria gentneri*, the Bureau Special Status Plants *Arabis modest, Clarkia heterandera, Cypripedium fasciculatum, Festuca elmeri, Meconella oregana, Mimulus bolanderi, and Sedum oblanceolatum*, or the Northwest Forest Plan Species, *Bryoria tortuosa* and *Dendriscocaulon intricatulum* within the confines of the Ferris Bugman Timber Sale harvest units or the proposed brushing and burn units. Detrimental indirect and cumulative effects might result if management activities allow fuel levels to accumulate to the point that a stand destroying fire occurs.

Direct, Indirect and Cumulative Effects Alternative 2, Proposed Action with Transportation Management
Alternative 2 would have no direct affect on the continued persistence of the Federally listed *Fritillaria gentneri*, the Bureau Special Status Plants *Arabis modest, Clarkia heterandera, Cypripedium fasciculatum, Festuca elmeri, Meconella oregana, Mimulus bolanderi, and Sedum oblanceolatum*, or the Northwest Forest Plan Species, *Bryoria tortuosa* and *Dendriscocaulon intricatulum* within the confines of the Ferris Bugman Timber Sale harvest units or the proposed brushing and burn units.

Cypripedium fasciculatum occurs in or on the periphery of 11 proposed harvest units and two proposed burn units. With the exception of Bugman #6 (60%), the proposed harvest level in these units is 45-50 % canopy closure. This is well below the level required to provide suitable habitat for *Cypripedium fasciculatum.* The variable radius buffers around known sites would allow for the continued persistence of isolated pockets of this species, however, the reduction of canopy closure to less than 60% in the surrounding stand would greatly reduce or completely eliminate the possibility that this species would spread to other parts of the stand in the foreseeable future.

Indirect and cumulative effects would most likely be detrimental to *Dendriscocaulon intricatulum*, which typically occurs on black oak stems less than 100 years of age under fairly dense (60 -100% canopy closure) stand conditions on ridges exposed to winter fog or in riparian areas. Reduction of canopy closure to 40% in the

surrounding stand would greatly reduce or completely eliminate the possibility that this species would spread to other parts of the stand in the foreseeable future.

The primary effects of road construction on the existing sites would be an increase in off road vehicle use, an increase in foot traffic, and an increased likelihood of camper or hunter caused fire. Any or all of these factors could lead to damage or loss of sites in the vicinity of the proposed road construction. These potential effects would be minimized by the stipulation that all new road construction would be closed to public access including off road vehicle use. Additional detrimental indirect and cumulative effects might result if future management activities allow fuel levels to accumulate to the point that a stand destroying fire occurs.

Direct, Indirect and Cumulative Effects of Alternative 3, Proposed Action with No Transportation Management

Alternative 3 would have no direct affect on the continued persistence of the Federally listed *Fritillaria gentneri*, the Bureau Special Status Plants *Arabis modest, Clarkia heterandera, Cypripedium fasciculatum, Festuca elmeri, Meconella oregana, Mimulus bolanderi, and Sedum* oblanceolatum, or the Northwest Forest Plan Species, *Bryoria tortuosa* and *Dendriscocaulon intricatulum* within the confines of the Ferris Bugman Timber Sale harvest units or the proposed brushing and burn units.

Cypripedium fasciculatum occurs in or on the periphery of 11 proposed harvest units and two proposed burn units. With the exception of Bugman #6 (60%), the proposed harvest level in these units is 45-50% canopy closure. This is well below the level required to provide suitable habitat for *Cypripedium fasciculatum.* The variable radius buffers around known sites would allow for the continued persistence of isolated pockets of this species, however, the reduction of canopy closure to less than 60% in the surrounding stand would greatly reduce or completely eliminate the possibility that this species would spread to other parts of the stand in the foreseeable future.

Indirect and cumulative effects would most likely be detrimental to *Dendriscocaulon intricatulum* which typically occurs on black oak stems less than 100 years of age under fairly dense (60 -100% canopy closure) stand conditions on ridges exposed to winter fog or in riparian areas. The 100 ft. radius buffers around known sites would allow for the continued persistence of isolated pockets of this species. However, reduction of canopy closure to 40% in the surrounding stand would greatly reduce or completely eliminate the possibility that this species would spread to other parts of the stand in the foreseeable future.

Additional detrimental indirect and cumulative effects might result to both Bureau Special Status and Northwest Forest plan species if future management activities allow fuel levels to accumulate to the point that a stand destroying fire occurs.

J. SOCIAL IMPACTS

Some locals residents (letters and petitions in EA file) have issues/concerns with the proposed action and the alternative. Because many people and some environmental groups believe the impacts have significance, there have been numerous requests for BLM to prepare an environmental impact statement for this project. From review of the issues/concerns BLM believes the significant impacts (i.e., controversy, similar actions) have been addressed in the Medford District RMP/EIS.

K. CRITICAL ELEMENTS

The following elements of the human environment are subject to requirements specified in statute, regulation, or executive order and must be considered in all EAs.

Critical Elements.

Critical Element	Affected Yes	Affected No	Critical Element	Affected Yes	Affected No
Air Quality		✔ **	T & E Species		✔ *
ACECs		✔	Wastes, Hazardous/Solid		✔
Cultural Resources		✔*	Water Quality		✔ **
Farmlands, Prime/Unique		✔	Wetlands/Riparian Zones		✔ **
Floodplains		✔	Wild & Scenic Rivers		✔
Nat. Amer. Rel. Concerns		✔	Wilderness		✔
Invasive, Nonnative Species		✔**	Environmental Justice		✔

*These affected critical elements could be impacted by the implementing the proposed action. Impacts are being avoided by project design.

**These affected critical elements would be impacted by implementing the proposed action. The impacts are being reduced by designing the proposed action with Best Management Practices, Management Action/Direction, Standard and Guidelines as outlined in the Amended NWFP, RMP, and the NWFP tiered to in Chapter 1. The impacts are not affected beyond those already analyzed by the above mentioned documents.

CHAPTER V
LIST OF AGENCIES AND PERSONS CONSULTED

SUMMARY OF PUBLIC INVOLVEMENT

Scoping for this project began in 1997 when BLM began the process of planning restoration projects across a large portion of the Middle Applegate Watershed. BLM evaluated land, vegetation, and stream conditions and developed a plan that included thinning forests and brushlands, reintroducing prescribed fire, and reducing sediment impacts to streams. This large landscape plan was called the "Appleseed Project." In May 1999, the Appleseed Environmental Assessment (EA) was released for public review. Many Applegate residents and others took the time to write lengthy critiques of the project and the EA. A common theme was that the scope of the project was too large, making it difficult for local residents to understand what was happening on public land. In order to better explain the proposed project actions, this EA analyzes a small portion of the larger Appleseed project. Upon completion of this EA, a legal notification was placed in the Medford Mail Tribune offering a 30-day public review and comment period. For additional information, please contact Bill Yocum or Lorie List at (541) 618-2384.

DISTRIBUTION LIST AND AVAILABILITY ON THE INTERNET

This EA was distributed to the following agencies and organizations.

Applegate Partnership/Applegate River Watershed Council
Applegate Ranger District - USFS
Association of O&C Counties
Audubon Society
Boise Corp.
Headwaters
Jackson Co. Commissioners
Jackson County Library; Ruch
Jackson County Library Applegate Branch
Klamath Siskiyou Wildlands Center
Oregon Department Forestry
Oregon Natural Resource Council
Oregon Department of Fish and Wildlife
Southern Oregon University
Southern Oregon Timber Industry Assoc.
The Pacific Rivers Council

TRIBES

The Confederated Tribes
Cow Creek Band of Umpqua Indians
Confederated Tribes of Grand Ronde
Confederated Tribes of Siletz
Klamath Tribe
Quartz Valley Indian Reservation (Shasta Tribe)
Shasta Nation
Confederated Bands [Shasta], Shasta Upper Klamath Indians
Confederated Tribes of the Rogue-table Rock and Associated Tribes

AGENCIES CONSULTED

U.S. Fish and Wildlife Service
U.S. National Marine Fisheries Service
U.S. Forest Service

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GLOSSARY OF TERMS USED IN THE EA

Allowable Sale Quantity: The gross amount of timber volume, including salvage, that may be sold annually from a specified area over a stated period of time in accordance with the management plan.

Area of Critical Environmental Concern (ACEC): An area of BLM administered lands where special management attention is needed to protect and prevent irreparable damage to important historic, cultural or scenic values, fish and wildlife resources or other natural systems or processes; or to protect life and provide safety from natural hazards.

Adaptive Management Area (AMA): Landscape units designated for development and testing of technical and social approaches to achieving desired ecological, economic, and other social issues.

Broadcast Burn: See Fuels Management.

Coarse Woody Debris (CWD): Any piece(s) of dead woody material, e.g., dead boles, limbs, and large root masses, on the ground in forest stards or in streams – *synonym* large woody debris (LWD), Coarse Woody Material (CWM) – *note* the type and size of material designated as CWD varies among classification systems.

colluvial – Pertaining to material or processes associated with transportation and/or deposition by mass movement (direct gravitational action) and local, unconcentrated runofff on side slopes and/or at the base of cliffs.

colluvium – Unconsolidated, unsorted earth material being transported or deposited on sideslopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local unconcentrated runoff.

Commercial Forest Land: Land declared suitable for producing timber crops and not withdrawn from timber production for other reasons.

Connectivity: A measure of the extent to which conditions between late-successional/old-growth forest areas provide habitat for breeding, feeding, dispersal, and movement of late-successional/old-growth-associated wildlife and fish species.

Core Area: That area of habitat essential in the breeding, nesting and rearing of young, up to the point of dispersal of the young.

Cumulative Effects: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (Definition from Council on Environmental Quality Regulations 40 CFR § 1508.7).

Cumulative Impacts: See "Cumulative Effects."

Density Management: Cutting of trees for the primary purpose of widening their spacing so that growth of remaining trees can be accelerated. Density management harvest can also be used to improve forest health, to open the forest canopy, or to accelerate the attainment of old growth characteristics if maintenance or restoration of biological diversity is the objective.

Diameter At Breast Height (dbh): The diameter of a tree 4.5 feet above the ground on the uphill side of the tree.

Direct Effects: Those impacts caused by the action and occuring at the same time and place. (Definition from Council on Environmental Quality Regulations 40CFR §1508.8).

Direct Impacts: See "Direct Effects."

Enchanted Forest: A local name for a small patch of riparian forest on BLM administered land along a small tributary of Slagle Creek. The popular Enchanted Forest Trail meanders through this forest.

Environmental Assessment: A systematic analysis of site-specific BLM activities used to determine whether such activities have a significant effect on the quality of the human environment and whether a formal environmental impact statement is required.

Environmental Impact Statement (EIS): A formal document to be filed with the Environmental Protection Agency that considers significant environmental impacts expected from implementation of a major federal action.

Erosion Hazard: Relates to the ease of detachment and movement of soil and rock particles, it is not meant to imply that this material has entered the aquatic environment, but rather the colluvial environment where it could remain for years to millennia. Almost all soils on hillslopes in the Watershed form in colluvium. Erosion Hazard is measured from slight to moderate to severe.

Fire regime: The type, intensity, size, and frequency of fires typical for a specific land area. The fires regime determines the scale of fire effects and the way fire influences an ecosystem.

Fuels Management:

Broadcast Burn: A fire used to burn grass and shrublands. Can be used to burn slash debris.
Underburn: A fire that consumes surface fuels but not trees and shrubs.

FY: Fiscal Year which starts on October 1 and ends on September 30 of the following year.

Indirect Effects: Those impacts which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. (Definition from Council on Environmental Quality Regulations 40CFR §1508.8).

Indirect Impacts: See "Indirect Effects."

Landing: A cleared area in the forest to which logs are yarded or skidded for loading onto trucks for transport.

Land Use Allocations: Allocations which define allowable uses/activities, restricted uses/activities, expressed in terms of area such as acres or miles, etc. Each allocation is associated with a specific management objective.

Late-Successional Reserve: A forest in its mature and/or old-growth stages that has been reserved.

Long Term: Greater than 10 years.

LWD: Large Woody Debris. See Coarse Woody Debris.

MBF: A method of timber measurement in which the unit is 1,000 board foot (bd ft, bf) A bd ft is the amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide.

Matrix Lands: Federal land outside of reserves and special management areas that will be available for timber harvest at varying levels.

NMFS: U.S. National Marine Fisheries Service.

Noncommercial Forest Land: Land incapable of yielding at least 20 cubic feet of wood per acre per year of commercial species; or land which is capable of producing only noncommercial tree species.

Northern Spotted Owl Dispersal Habitat:

Northern Spotted Owl Suitable Habitat:

NWFP: "Northwest Forest Plan," an interagency document that directs how the USFS and BLM can manage their lands in order to protect the Northwest spotted owl and other biological resources (e.g. riparian areas). The official title of this document is: "Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and the Standards and Guidelines for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (1994)."

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O&C Lands: Public lands granted to the Oregon and California Railroad Company and subsequently revested to the United States.

ODEQ: Oregon Department of Environmental Quality.

OSHA: Occupational Safety and Health Administration

Potential Area of Critical Concern: An area of BLM administered land that meets the relevance and importance criteria for ACEC designations, as follows:

1) Relevance. There shall be present a significant historic, cultural, or scenic value; a system or process; or natural hazard

2) Importance. The above described value, resource, system, process, or hazard shall have substantial significance and values. This generally requires qualities of more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern. A natural hazard can be important if it is a significant threat to human life or property.

Precommercial Thinning: The practice of removing some of the trees of less than merchantable size from a stand so that remaining trees will grow faster.

Prescribed Fire: A fire burning under specified conditions that will accomplish certain planned objectives.

Public Domain Lands: Original holdings of the United States never granted or conveyed to other jurisdictions, or reacquired by exchange for other public domain lands.

Regeneration Harvest: Timber harvest conducted with the partial objective of opening a forest stand to the point where favorable tree species will be reestablished.

Riparian area: Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, and associated high water tables and soils which exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows.

Riparian Reserve: Portions of watersheds where riparian-dependent resources receive primary emphasis and where special standards and guidelines apply (NWFP Standards and Guidelines pg. B-12).

RMP: Resource Management Plan, Medford District's Land Use Plan, a publically-reviewed document that directs Medford District activities. The complete title of this document is: "Medford District Record of Decision and Resource Management Plan (1995)."

Road: A designated road is a linear "transportation facility" on which state-licensed, four wheeled vehicles can travel. By definition, these do not qualify as trails. BLM creates a road record when known dollars are spent to construct a road. This is the capitalized value. When a road is constructed, the site is altered. Alterations may include compaction of soil, interception of surface and some sub-surface flows, etc. The site potential for forest development has been altered and the area does not function as forest land.

Short Term: 10 years or less.

Silviculture: The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis.

Stem Exclusion Stage: The stage in forest development when new stems are prevented from successfully invading, and because some existing stems die are thus excluded from the stand. At this stage the stand appears to have a closed forest canopy layer.

Underburn: See Fuels Management.

Understory Reinitiation Stage: The stage in forest development when overstory trees start declining in vigor and mortality may occur. This provides growing space for herbaceous, shrub and tree species in the understory hence the reinitiated understory.

Vegetation Condition Class: The BLM Medford District Watershed Analysis Committee designated 8 vegetation condition classes to describe the types of and size of vegetation present on the landscape. The condition classes are as follows: grass and herbaceous vegetation; shrub lands; Hardwood/Woodlands; early seral stage trees (0 to 5 years of age); seedlings/saplings (0 to 4.9 inches DBH); poles (5 to 11 inches DBH); mid (11 to 21 inches DBH); and mature/Old-growth (21 inches DBH and larger trees).

Wilderness Study Area: A roadless area inventoried and found to be wilderness in character, having few human developments and providing outstanding opportunities for solitude and primitive recreation, as described in Section 603 of the Federal Land Policy and Management Act (FLPMA) and in section 2(c) of the Wilderness Act of 1964.

Woodland: Forest land producing trees not typically used as saw timber products and not included in calculation of the commercial forest land ASQ.

APPENDICES

APPENDIX A

Commercial Thinning of the Mid and Mature/Old-growth Condition Classes

The majority of the commercial acreage to be treated would be commercially thinned. The areas to be thinned would have the highest stocking densities and would be located between the group selection and selection areas. The treatment will be a combination of crown spacing and basal area thinning. Homogeneous Douglas-fir stands with constant amounts of basal area that fall within the range of 180 to 300 ft^2 per acre would be treated using basal area guidelines to reduce basal area to between 120 and 160 ft^2 per acre. Heterogeneous stands with a wide range of basal areas when trees tend to be clumped would be treated using crown spacing guidelines. Crown spacing will be used to release old-growth trees and desired early seral species.

Moist commercial Douglas-fir timber stands will be thinned to a 3 to 15-foot crown spacing. On dry Douglas-fir and pine sites, trees will be thinned to a 10 to 20-foot crown spacing. In areas where tree mortality is occurring because of bark beetles, stands will be thinned to a 15 to 30-foot crown spacing. Trees recommended for harvest include suppressed, intermediate, and some codominant crown class trees with live crown ratios of less than 30%, trees lacking branches on one or more sides of the bole that are not conical in shape, dying trees with pitch tubes, a portion of the dead trees with salvageable wood, and trees with broken or forked tops. Second growth trees would also be thinned from around trees with old-growth characteristics to assure the survival of the dominant, structurally unique, old-growth trees.

Group Selection Openings

On dry ponderosa pine or Douglas-fir sites, 1/5 to ½-acre group selection areas (104 to 166-foot diameter openings) would be harvested adjacent to suitable pine and seed trees creating openings arranged in a random, natural pattern. These openings are needed to increase the stocking level of ponderosa pine (ponderosa pine needs 25% full sunlight to grow) and incense cedar. Eighty ft^2 BA/AC of timber will be left standing around the group selection areas to allow more light to enter the openings and to create spatial variability. In areas with a cool, moist micro environment 1/7 to 1/6-acre group selection areas (88 to 96-foot diameter openings) around suitable Douglas-fir seed trees will be created to establish Douglas-fir seedlings. Old-growth yellow bark pine can be centered in the group selection openings.

Commercial Thinning of Pole Stands

Three situations are common: 1.) There are dense, decadent pole stands on northeast aspects that receive sun for most of the day. The Douglas-fir is short in height and poison oak and grasses are common in the understory; 2.) Decadent patches of trees may be found with the majority of the trees having crown ratios of 30% or less; and 3.) There are thrifty, young stands with good crown ratios (30% or more) on cool, moist sites.

For the first two situations only trees with crown ratios of 30% or more would be marked to leave to a 3 to 15-foot crown spacing. Trees with crown ratios of less than 30% will be harvested. Sometimes openings less than 1-acre in size may result.

Thrifty stands should also be marked to a 3 to 15-foot crown spacing but due to better site conditions and trees with high crown ratios, more basal area per acre will probably remain.

Shrubland and Woodland Treatments

Selected noncommercial treatment areas (shrub lands and woodlands) would be treated by intermediate treatments (precommercial and commercial thinning), the individual tree selection method, and prescribed burning.

The objectives for treating the woodlands are as follows: reduce the fire hazard by thinning all vegetation and eliminating all ladder fuels; restore oak/native grass plant associations; enhance the vigor and quality of the hardwood species (mainly oak to induce acorn crops); use the coppice method to introduce another age class of hardwood species; and decrease the abundance of Douglas-fir and shrub species.

Individual, merchantable Douglas-fir trees can be harvested if ponderosa pine trees are also present (this saves the possible habitat and woody debris component of the ecosystem). Strips or patches of merchantable conifers and

hardwoods within the woodlands, where favorable aspects and microenvironments exist, should be thinned to approximately 36 trees per acre (1 to 10 of these trees being conifers). Douglas-fir seedlings through the pole timber size classes should be cut. An occasional Douglas-fir tree may be left if no pine or incense cedar are available to leave. All trees with old-growth characteristics should remain and all the vegetation beneath these trees should be cut to ensure their survival. Cut suppressed and intermediate crown class oak trees to establish stump sprouts. Old, tall whiteleaf manzanita shrubs should remain that produce large berry crops. All other whiteleaf manzanita should be cut. Wedgeleaf ceanothus is also desired, but should be thinned to stimulate sprouting. The wedgeleaf ceanothus shrubs should be cut to heights varying from 6 inches to 3 feet.

The objectives for treating the shrub lands are as follows: increase wildlife forage production and quality, decrease fire hazard by reducing the stocking levels and ladder fuels of the shrub species, eliminate or reduce the abundance of noxious weeds, and prevent the encroachment of Douglas-fir.

Individual, merchantable Douglas-fir trees can be harvested if ponderosa pine trees are also present. Douglas-fir seedlings through the pole timber size classes should be cut. All trees with old-growth characteristics should remain and all the vegetation beneath these trees should be cut to ensure their survival. All ponderosa pine and incense cedar trees should be retained. All oak trees except for trees less than 6 inches DBH with crown ratios of less than 10% shall remain. Leave old, tall whiteleaf manzanita shrubs (but prune the lower ladder fuel branches) that produce large berry crops at a 15 to 25-foot crown spacing. All other whiteleaf manzanita should also be cut to the 15 to 25-foot crown spacing. Wedgeleaf ceanothus should also be left, but cut the shrubs to various heights to stimulate sprouting. The wedgeleaf ceanothus shrubs should be cut to heights varying from 6 inches to 3 feet. Small patches of starthistle should be burned by piling slash on top of the patches and then burning them.

Dense manzanita patches can be thinned by cutting a series of trails to desired vegetation such as oak trees. Prescribed burning will also be used where understory fuels are light in the shrub lands and woodlands.

Wildlife Connectivity Corridors

Five areas have been designated as wildlife corridors to serve as dispersal, hiding cover, and travel corridors. In these areas low vigor trees with crown ratios of less than 30% will be harvested while maintaining a minimum of 60% canopy closure.

Proposed Action Alternative (Alternative 2) Roads

Proposed new road construction in the Ferris Bugman project area.

Road Number	Approximate Length (miles)	Existing Surface: Depth (inches) and Type[1]	Control [2]	Possible Improvements: Depth (inches) and Type[1]	Seasonal Restriction[3] (for log hauling)
37-4-22.0*	4.5	-	BLM	6" - 8" ABC	1
37-4-28.2	0.9	-	BLM	8" ABC	1
38-4-31.0	0.6	-	BLM	8" ABC	1
Total Mileage:	6				

1 - = no improvements; NAT = natural; ASC = aggregate surface course; ABC = aggregate base course; BST bitumin surface treatment; PRR = pit run rock; GRR = grid rolled.
2 BL = Bureau of Land Management; PV = private.
3 0 = no restrictions; 1 = hauling restricted between 10/15 and 5/15; 2 = hauling restricted between 11/15 and 4/15.
* Portion to be amended in M-2000 Right-of-Way Agreement with Indian Hills and the M-660 Agreement with Boise Corp..

Proposed road decommissioning[a] in the Ferris Bugman project area.

Road Number	Approximate Length (miles)	Existing Surface: Depth (inches) and Type[1]	Control[2]	Possible Improvements: Depth (inches) and Type[3]	Seasonal Restriction[4] (for log hauling)
38-4-1	0.3	NAT	BL	Natural Decom.	1
T38, R4W Sec. 4 & 9	1.2	NAT	BL/ BC	Mechanical Decom.	1
T38, R4W Sec. 10, 11, 14, & 15	2.2	NAT	BLM	Natural Decom	1
T38S,R4W Sec. 13	0.6	NAT	BLM	Natural Decom	1
38-4-17	0.2	NAT	BLM	Mechanical Decom.	1
38-4-20.1	0.8	NAT	BLM	Mechanical Decom.	1
T38S,R4W Sec. 19&20	0.1	NAT	BLM	Mechanical Decom.	1
T38S,R4W Sec. 30	0.7	NAT	BLM	Mechanical Decom.	1
T38S,R4W Sec. 31	0.3	NAT	BLM	Mechanical Decom.	1
38-4-19.0	0.5	NAT	BLM	Mech/Nat Decom.	1
38-4-31.0	0.2	NAT	BLM	Mechanical Decom.	1
Total Mileage:	7.1				

1) NAT = natural.
2) Natural Decommission - Sections of these roads would be allowed to decommission naturally but may include some selective ripping, removal of drainage structures, construction of water bars and barricades.
Mechanical Decommission - This usually includes ripping, removing drainage structures, seeding and/or planting, mulching, constructing water bars and barricades.
3) BL = Bureau of Land Management; PV = private; BC = Boise Corporation
4) 0 = no restrictions; 1 = hauling restricted between 10/15 and 5/15; 2 = hauling restricted between 11/15 and 4/15.

Proposed Action Alternative (Alternative 2) Non-Commercial (Hardwood/Brushfield Treatments)

Unit number	Acres	Proposed Initial Fuels Treatment
N1	102	Manual treatment with Broadcast burn
N2	78	Manual treatment with Broadcast burn
N3	112	Broadcast burn

N4	325	Broadcast burn
N5	107	Manual treatment with Broadcast burn
N8	293	Broadcast burn
N9	151	Broadcast burn
N12	143	Manual treatment with broadcast burn
N13	28	Underburn
N14	36	Underburn
N15	10	Underburn
N16	11	Underburn
N17	141	Manual treatment
Total	1537	

Proposed Action Alternative (Alternative 2) Pre-commercial Thinning Treatment

OI Unit	Acres	OI Unit	Acres	OI Unit	Acres
127282	12.5	127284	2.8	156601	10.0
156614	738	156647	2.8	157344	3.1
157369	6.3	157370	2.1	157374	24.5
157436	13.4	157441	4.3	157445	22.9
157450	15.8	157452	19.0	157453	5.7
157463	13.3	157833	15.2	157842	42.7
157850	32.4	157851	3.0	157858	5.7
157868	9.4	157986	24.4	158012	15.4
158322	5.4	158426	13.0	158430	14.2
158448	13.7				

Proposed Action Alternative (Alternative 2) Commercial Thinning Treatment

UNIT	UNIT ACRES	SILVIC. METHOD 1/	YARDING SYSTEM 2/	FUELS MGT 3/	VOLUME CUT/ACRE (range)(MBF)	VOLUME CUT/UNIT (range)(MBF)
B1	44	MDF	H	HP/UB/SL	2 - 4	88 - 176
B2	4	DDF	H	HP/UB/SL	2 - 4	8 - 16
B3	8	DDF	H	HP/UB/SL	2 - 4	16 - 32

UNIT	UNIT ACRES	SILVIC. METHOD 1/	YARDING SYSTEM 2/	FUELS MGT 3/	VOLUME CUT/ACRE (range)(MBF)	VOLUME CUT/UNIT (range)(MBF)
B4	32	MDF	PS/H	HP/UB/SL	2 - 4	64 - 128
B5	11	DDF	H	HP/UB/SL	2 - 4	22 - 44
B6	90	WC	PS/H	HP/UB/SL	1 - 3	90 - 270
B7	5	DDF	H	HP/UB/SL	2 - 4	10 - 20
B8	41	DDF	H	HP/UB/SL	2 - 4	82 - 164
B9	18	DDF	H	HP/UB/SL	2 - 4	36 - 72
B10A	31	DDF/MDF	H	HP/UB/SL	2 - 4	62 - 124
B10B	2	DDF	H	HP/UB/SL	2 - 4	4 - 8
B11	14	SmCT	H	HP/UB/SL	1 - 3	14 - 42
B12	31	P/DFR	H	HP/UB/SL	2 - 4	62 - 124
B13	22	P	CR/PS	HP/UB/SL	2 - 4	44 - 88
B14	41	DDF	PS/H	HP/UB/SL	2 - 5	82- 205
B15	112	DDF/DFR	PS/H	HP/UB/SL	2 - 5	224 - 560
B16	25	DDF/P	H	HP/UB/SL	2 - 4	50 - 100
S1	10	DDF	H	HP/UB/SL	2 - 4	20 - 40
S2	23	P	H	HP/UB/SL	2 - 4	46 - 92
S3a	114	P/WC	CR/PS/H	HP/UB/SL	1 - 5	114 - 570
S3b	4	WC	H	HP/UB/SL	1 - 3	4 - 12
S3c	6	WC	H	HP/UB/SL	1 - 3	6 - 18
S4	3	WC	H	HP/UB/SL	1 - 3	3 - 9
S8a	6	P	H	HP/UB/SL	2 - 4	12 - 24
S8b	142	DDF/SmCT/ P	CR/PS/H	HP/UB/SL	2 - 4	284 - 568
S8c	2	DDF	H	HP/UB/SL	2 - 4	4 - 8
S8d	13	P/DDF	H	HP/UB/SL	2 - 4	26 - 52
S8e	2	DDF	H	HP/UB/SL	2 - 4	4 - 8
S8f	34	DDF	PS/H	HP/UB/SL	2 - 4	68 - 136

UNIT	UNIT ACRES	SILVIC. METHOD 1/	YARDING SYSTEM 2/	FUELS MGT 3/	VOLUME CUT/ACRE (range)(MBF)	VOLUME CUT/UNIT (range)(MBF)
S8g	201	P/DDF/DFR	CR/PS/H	HP/UB/SL	1 - 5	201 - 1005
S8h	156	P/DDF	CR/PS/H	HP/UB/SL	1 - 4	156 - 624
S9	1	P	H	HP/UB/SL	2 - 4	2 - 4
S12a	9	P	H	HP/UB/SL	1 - 4	9 - 36
S12b	9	P	H	HP/UB/SL	1 - 4	9 - 36
S15	10	P	H	HP/UB/SL	1 - 4	10 - 40
S16	42	DDF/DFR	H	HP/UB/SL	2 - 4	84 - 168
S18	8	P	H	HP/UB/SL	1 - 3	8 - 24
S19	143	DDF	CR/PS/H	HP/UB/SL	2 - 4	286 - 572
F1	18	DDF	PS	HP/UB/SL	3 - 7	54 - 126
F2	33	DDF	H	HP/UB/SL	3 - 7	99 - 231
F3	1	DDF	H	HP/UB/SL	3 - 7	3 - 7
F4	89	P/DDF	CR/PS	HP/UB/SL	3 - 5	267 - 445
F5	2	DDF	CR	HP/UB/SL	2 - 4	4 - 8
F6	8	DDF/DFR	PS	HP/UB/SL	3 - 7	24 - 56
F7	4	DFR	PS	HP/UB/SL	3 - 7	12 - 28
F8	15	DDF	PS/H	HP/UB/SL	3 - 6	45 - 90
F9	43	DDF	H	HP/UB/SL	3 - 7	129 - 301
F10	26	DDF	PS	HP/UB/SL	3 - 6	78 - 156
F11	23	DDF/DFR	H	HP/UB/SL	3 - 7	49 - 161
F13	42	P	PS/H	HP/UB/SL	2 - 5	84 - 210
F14	14	DDF	H	HP/UB/SL	2 - 5	28 - 70
F15	11	DFR	H	HP/UB/SL	3 - 6	33 - 66
F16	37	DDF	CR/PS/H	HP/UB/SL	3 - 5	111 - 185
F17	17	DDF	CR/PS	HP/UB/SL	3 - 6	51 - 102
F18	4	DDF	CR	HP/UB/SL	2 - 4	8 - 16
SUM	1,856					3393 - 8477

1/ Silvicultural Prescriptions (designates dominate prescription)
MDF=Moist Douglas- fir DDF=Dry Douglas-fir DFR=Douglas-fir Regen. P=Pine
WC =Wildlife Conductivity SmCT=8" pole commercial thin
2/Yarding Systems CR=Crawler PS=Cable H=Helicopter
3/Fuels Management HP=Handpile, cover and burn UB=Underburn Sl=Slashing

Alternative to the Proposed Action Alternative (Alternative 3) Roads
Proposed improvements on existing roads in the Ferris Bugman project area.

Road Number	Approximate Length (miles)	Existing Surface: Depth (inches) and Type[1]	Control[2]	Possible Improvements: Depth (inches) and Type[1]	Seasonal Restriction[3] (for log hauling)
37-4-22	0.1	6" ASC	BLM	4" ASC	2
37-4-22	0.8	6" ASC	NE	4" ASC	2
37-4-22	0.7	6" ASC	BLM	4" ASC	2
37-4-22	0.2	8" ABC	PB	2" ASC	2
37-4-22*	1.8	8" ABC	BLM	2" ASC	2
37-4-27.1	0.8	6" ASC	BLM	4" ASC	2
37-4-27.4	0.4	NAT	BLM	8" ABC	1
38-3-5	0.8	12" ASC	BLM	-	2
"	0.3	12" ASC	BLM	-	2
"	2.0	10" ASC	BLM	-	2
"	0.9	7" ABC	BLM	-	1
38-3-5.1	0.2	12" ASC	BLM	-	2
38-3-5.2	1.3	6" ASC	BLM	4" ASC	2
38-3-6	2.8	4" ASC	BLM	-	1
38-3-7.1	2.5	NAT	BLM	8" ASC/Gate	1
38-3-8	0.4	6" ASC	BLM	4" ASC	2
38-4-17	1.6	10" BST	BLM	-	2
"	2.5	8" ASC	BLM	-	1
38-4-20	1.0	8" GRR	BLM	-	1
38-4-29	2.6	6" GRR	BLM	4" ASC	2
38-4-31	1.6	NAT	BLM	8" ABC/Gate	1

Road Number	Approximate Length (miles)	Existing Surface: Depth (inches) and Type[1]	Control[2]	Possible Improvements: Depth (inches) and Type[1]	Seasonal Restriction[3] (for log hauling)
"	0.5	NAT	PV	8" ABC	1
Total	25.8				

1 - = no improvements; NAT = natural; ASC = aggregate surface course; ABC = aggregate base course; BST bitumin surface treatment; PRR = pit run rock; GRR = grid rolled.
2 BL = Bureau of Land Management; PV = private;
3 0 = no restrictions; 1 = hauling restricted between 10/15 and 5/15; 2 = hauling restricted between 11/15 and 4/15.
* Portion to be amended in M-2000 Right-of-Way Agreement with Indian Hills and M-660 with Boise Corp.

Alternative to the Proposed Action Alternative (Alternative 3) Non-Commercial (Hardwood/Brushfield Treatments)

Unit number	Acres	Proposed Initial Fuels Treatment
N5	107	Manual treatment with Broadcast burn
N8	293	Broadcast burn
N9	151	Broadcast burn
N12	143	Manual treatment with broadcast burn
N13	28	Underburn
N14	36	Underburn
N15	10	Underburn
N16	11	Underburn
N17	141	Manual treatment
Total	920	

Alternative to the Proposed Action Alternative (Alternative 3) Commercial Thinning

UNIT	UNIT ACRES	SILVI. METHOD 1/	YARDING SYSTEM 2/	FUELS MGT 3/	VOLUME CUT/ACRE (range)(MBF)	VOLUME CUT/UNIT (range)(MBF)
B1	44	MDF	H	HP/UB/SL	2 - 4	88 - 176
B2	4	DDF	H	HP/UB/SL	2 - 4	8 - 16
B3	8	DDF	H	HP/UB/SL	2 - 4	16 - 32
B4	32	MDF	H	HP/UB/SL	2 - 4	64 - 128
B5	11	DDF	H	HP/UB/SL	2 - 4	22 - 44

UNIT	UNIT ACRES	SILVI. METHOD 1/	YARDING SYSTEM 2/	FUELS MGT 3/	VOLUME CUT/ACRE (range)(MBF)	VOLUME CUT/UNIT (range)(MBF)
B6	90	WC	PS/H	HP/UB/SL	1 - 3	90 - 270
B7	5	DDF	H	HP/UB/SL	2 - 4	10 - 20
B8	41	DDF	H	HP/UB/SL	2 - 4	82 - 164
B9	18	DDF	H	HP/UB/SL	2 - 4	36 - 72
B10A	31	DDF/MDF	H	HP/UB/SL	2 - 4	62 - 124
B10B	2	DDF	H	HP/UB/SL	2 - 4	4- 8
B11	14	SmCT	H	HP/UB/SL	1 - 3	14 - 42
B12	31	P/DFR	H	HP/UB/SL	2 - 4	62 - 124
B13	22	P	CR/PS	HP/UB/SL	2 - 4	44 - 88
B14	41	DDF	PS/H	HP/UB/SL	2 - 5	82- 205
B15	112	DDF/DFR	PS/H	HP/UB/SL	2 - 5	224 - 560
B16	25	DDF/P	H	HP/UB/SL	2 - 4	50 - 100
S3a	89	P/WC	H	HP/UB/SL	1 - 5	89 - 445
S3b	4	WC	H	HP/UB/SL	1 - 3	4 - 12
S3c	6	WC	H	HP/UB/SL	1 - 3	6 - 18
S4	3	WC	H	HP/UB/SL	1 - 3	3 - 9
S8a	6	P	H	HP/UB/SL	2 - 4	12 - 24
S8b	130	DDF/SmCT /P	H	HP/UB/SL	2 - 4	260 - 520
S8h	28	P/DDF	H	HP/UB/SL	1 - 4	28 - 112
S9	1	P	H	HP/UB/SL	2 - 4	2 - 4
S16	42	DDF/DFR	H	HP/UB/SL	2 - 4	84 - 168
S18	8	P	H	HP/UB/SL	1 - 3	8 - 24
S19	22	DDF	H	HP/UB/SL	2 - 4	44 - 88
F1	18	DDF	PS	HP/UB/SL	3 - 7	54 - 126
F2	33	DDF	H	HP/UB/SL	3 - 7	99 - 231
F3	1	DDF	H	HP/UB/SL	3 - 7	3 - 7
F4	89	P/DDF	CR/PS	HP/UB/SL	3 - 5	267 - 445

UNIT	UNIT ACRES	SILVI. METHOD 1/	YARDING SYSTEM 2/	FUELS MGT 3/	VOLUME CUT/ACRE (range)(MBF)	VOLUME CUT/UNIT (range)(MBF)
F5	2	DDF	CR	HP/UB/SL	2 - 4	4 - 8
F6	8	DDF/DFR	PS	HP/UB/SL	3 - 7	24 - 56
F7	4	DFR	PS	HP/UB/SL	3 - 7	12 - 28
F8	15	DDF	PS/H	HP/UB/SL	3 - 6	45 - 90
F9	43	DDF	H	HP/UB/SL	3 - 7	129 - 301
F10	26	DDF	H	HP/UB/SL	3 - 6	78 - 156
F11	23	DDF/DFR	H	HP/UB/SL	3 - 7	49 - 161
F13	42	P	H	HP/UB/SL	2 - 5	84 - 210
F17	17	DDF	CR/PS	HP/UB/SL	3 - 6	51 - 102
F18	4	DDF	CR	HP/UB/SL	2 - 4	8 - 16
SUM	1,195					2405 - 5534

1/ Silvicultural Prescriptions (designates dominate prescription)
MDF=Moist Douglas- fir DDF=Dry Douglas-fir DFR=Douglas-fir Regen. P=Pine
WC =Wildlife Conductivity SmCT=8" pole commercial thin

2/Yarding Systems CR=Crawler PS=Cable H=Helicopter

3/Fuels Management HP=Handpile, cover and burn UB=Underburn Sl=Slashing

Map 1: Ferris Bugman Project boundary and federal lands.