Butte Falls Hazardous Fuels Reduction Environmental Assessment

DOI-BLM-OR-M050-2009-0035-EA

BLM

Butte Falls Resource Area

September 2009

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Medford District Office
3040 Biddle Road
Medford, Oregon 97504
email address: Medford_Mail@blm.gov

IN REPLY REFER TO:
1792 (ORM050)

SEP 09 2009

Dear Neighbor:

The Butte Falls Resource Area of the Medford District, Bureau of Land Management (BLM) is in the final stages of the Butte Falls Hazardous Fuels Reduction Project Environmental Assessment (EA) (DOI-BLM-OR-M050-2009-0035-EA). This letter is to inform you the EA will be available for your review on the Medford District website [http://www.blm.gov/or/districts/medford/plans/index.php] on September 12, 2009. If the online version does not meet your needs, you may visit the Medford District Office, 3040 Biddle Road, Medford, Oregon for a CD or paper copy. You may also telephone Jean Williams at (541) 618-2385 or e-mail Medford_Mail@blm.gov (be sure to include "Attention: Jean Williams") to request a CD or paper copy to be sent to you.

The proposed project involves the following activities **on BLM-administered lands** located throughout the Butte Falls Resource Area:

- Thin 7,000 acres of vegetation, hand pile the slash, and burn the piles.
- Thin 900 acres along the Butte Falls Highway and broadcast burn the slash.
- Maintenance underburn or brush the thinned acres in 3 to 10 years.

The fifteen (15) day comment period for this EA will begin when the legal notice is published in the *Medford Mail Tribune* newspaper on September 12, 2009. Any comments you may have regarding this project must be received by September 28, 2009 to be considered in final decisions for this proposal. Please send comments to Jean Williams, Butte Falls Resource Area Planning and Environmental Coordinator, Medford District BLM, 3040 Biddle Road, Medford, Oregon 97504, or e-mail your comments to Medford_Mail@blm.gov ("Attention: Jean Williams"). Questions on the proposed project should be directed to Al Mason at (541) 618-2391 or Jean Williams at (541) 618-2385.

Remember, all comments will be made available for public review. If you would like your name, street address or both withheld from public review, or from disclosure under the Freedom of Information Act, please state this clearly at the beginning of your written comment. We will honor your request to the extent allowed by law. All comments received from organizations or officials of organizations, businesses, or government agencies will be made available for public inspection in their entirety.

Sincerely,

Jon K. Raby
Field Manager
Butte Falls Resource Area

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1.0 What Action is Proposed and Why?

1.1 Introduction

The Bureau of Land Management (BLM), Butte Falls Resource Area, is proposing to implement the Butte Falls Hazardous Fuels Reduction Project. This Environmental Assessment (EA) documents the environmental analysis the BLM conducted to estimate the site-specific effects on the human environment that may result from the implementation of this fuels reduction proposal. The analysis documented in this EA will provide the BLM authorized officer, the Butte Falls Resource Area Field Manager, with current information to aid in the decision-making process. This EA 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 regulations on Implementation of the National Environmental Policy Act of 1969 (43 CFR part 46).

1.1.1 What Action is the BLM Proposing?

The Bureau of Land Management (BLM) proposes the following activities:

- Thin 7,000 acres of vegetation and hand pile and burn the slash, or underburn.
- Thin 900 acres along the Butte Falls Highway and broadcast burn the slash.
- Maintenance underburn or brush the thinned acres in 3 to 10 years.

Hazardous fuels reduction activities are only proposed on BLM-administered lands and 80 acres of private lands. Private lands are also included in this project because the private land owners received Federal funds for hazardous fuel reduction. The private land owners, through the Seven Basins Watershed Council, applied for funds supplied under Title II of the Secure Rural Schools and Community Self-Determination Act of 2000 (Public Law 106-393). No other private lands are proposed for hazardous fuels reduction in this project.

This project would reduce hazardous fuels by thinning noncommercial-size vegetation on BLM-administered lands to reduce the threat of large-scale wildfires and their potential to cause adverse effects on federally managed resources, private property, and homes adjacent to federally managed lands.

1.1.2 Where is the Action Proposed to Occur?

The Butte Falls Hazardous Fuels Reduction Project is located throughout the Butte Falls Resource Area (Map 1). Hazardous fuels reduction is proposed in Wildland/Urban Interface (WUI) lands in the Evans Creek, Gold Hill/Rogue River, and Shady Cove/Rogue River fifth field watersheds.

The project is proposed on BLM-administered lands in the following locations:

Township 33 South, Range 2 West, section 29

Township 34 South, Range 1 East, sections 29 and 31

Township 34 South, Range 1 West, sections 3, 9, 10, 11, 14, 15, 17, 23, and 27

Township 34 South, Range 2 West, sections 9, 10, 15, 16, 17, 19, 20, 21, and 27

Township 34 South, Range 3 West, sections 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, and 35

Township 34 South, Range 4 West, sections 21, 22, 27, and 29

Township 35 South, Range 1 East, sections 5, 6, 7, and 8

Township 35 South, Range 1 West, section 7

Township 35 South, Range 2 West, section 3

Township 35 South, Range 3 West, sections 9, 17, 27, 32, 33, and 34

Township 35 South, Range 4 West, sections 17, 31, 32, 33, 34, and 35

Township 36 South, Range 3 West, sections 1, 11, 12, and 13

Township 36 South, Range 4 West, sections 3, 4, 5, and 7

Township 36 South, Range 5 West, sections 1 and 12

NOTE: Private lands (80 acres) in Township 35 South, Range 3 West, sections 32 and 33 are included in this project because they would receive Federal funds for hazardous fuels reduction.

1.3 Why is the BLM Proposing this Project?

1.3.1 Need for the Project

Fire, both in its historic frequency and its relative absence over the past 100 years, has been the primary natural disturbance process that shaped the existing vegetation condition and seral stage distribution across the Project Area. Lands in the Project Area have missed several fire cycles in the last 100 years. The probability of a stand-replacing crown fire is much higher now than 100 years ago because of the increased surface and ladder fuels. As a result of the absence of fire, forest fuels are building up and creating more fire-prone vegetative conditions, especially in the lower to middle elevations within the Project Area. Shade-tolerant and less fire resistant species have replaced the more fire adapted species such as ponderosa pine. Both BLM managed resources and rural residential areas are threatened by an unacceptably high potential for stand-replacing wildfires. Jackson County Fire Risk Analysis data indicate that 78 percent of the Butte Falls Resource Area has a fire hazard rating of moderate to high. Hazardous fuels need to be reduced in strategic areas on BLM-administered lands to reduce the potential for a large-scale wildland fire, improve forest resiliency, and aid fire suppression activities.

Figure 1. Forest fuels are increasing and need to be reduced.

The Project Area contains important winter foraging areas for deer and elk. Vegetation is composed of decadent wedgeleaf ceanothus. Deer and elk prefer to forage on the fresh new growth on the ceanothus and the forbs that will grow after the thinned areas are opened up. The BLM needs to cut back the old vegetation to increase desirable browse and forage and provide increased winter forage opportunities for deer and elk.

1.3.2 Purpose (Objectives) of the Project

In order to be considered a reasonable alternative, any action alternative must meet the objectives provided in the 1995 ROD/RMP for projects to be implemented in the Project Area. The 1995 ROD/RMP provides the following direction for Fire and Fuels management:

> "Reduce natural fuel hazards on BLM-administered lands in rural interface areas" (1995 ROD/RMP, p. 89).
>
> "Coordinate fire management activities in rural interface areas with local governments, agencies, and landowners" (1995 ROD/RMP, p. 89).
>
> "Maintain or enhance forage where appropriate by creating small openings in conifer stands of all ages, prescribed burning, seeding, fertilizing, underburning forest stands, or other means (1995 ROD/RMP, p. 48).

The proposed action is designed to implement this direction and achieve the objectives of reducing hazardous fuels, improving stand resiliency, coordinating fire management activities, and increasing desirable forage for deer and elk.

1.4 What are the Issues and How were they Identified?

The BLM developed this project in collaboration with the Seven Basins Watershed Council, local residents, fire districts, Oregon Department of Forestry (ODF), Oregon Department of Fish and Wildlife (ODFW), and BLM staff working on fuels reduction in the WUI. Fire and fuels management personnel met with neighborhood groups and watershed councils to discuss ongoing efforts for fuels reduction. Outreach included discussions with local fire districts and adjacent land owners concerning the coordination of fuel treatments on private and public land. These discussions help the BLM prioritize areas in need of fuels hazard reductions and helped identify potential issues.

> The project [Seven Basins Neighborhood Fire Planning Project] has fostered interagency coordination and better agency communication with local residents. Prior to the start of the project, ODF was actively promoting defensible space work in the watershed, but not on a strategic basis or in concert with planned fuels reduction on adjacent BLM lands. BLM's fuels treatment activities were planned largely independently of fuels treatments on private lands. This project has helped link these efforts and bring community members together (Seven Basins Community Wildfire Protection Plan 2006).

1.4.1 Scoping

Scoping consists of internal and external input on the issues that will be addressed in this document. Internal scoping involved a team of BLM specialists representing resources that may be affected by the Proposed Action. This team helped define the issues and refine the Proposed Action.

The BLM initiated public scoping on July 27, 2009 by mailing a letter to 421 adjacent landowners, businesses, organizations, tribes, government agencies, and other interested parties. The letter asked the recipient to identify any issues or concerns they may have with the proposed fuel reduction project. In response, the BLM received seven letters containing scoping comments. The scoping comments the BLM received from the public letters identified concerns with air quality as it relates to smoke from prescribed burning, pile burning, and the plastic used to cover the piles; long-term maintenance of the thinned areas; and access to proposed thinning areas.

1.4.1 Issues

Internal and external scoping indicated the following issues were relevant, were used to disclose consequences, may affect the design of the project actions, or helped prescribe mitigation measures for the project. The issues identified were resolved with project design features or through the design of the project.

1.4.1.1 Air Quality

- Will underburning, broadcast burning, and slash pile burning affect air quality or human health beyond the limits set by the Oregon Smoke Management Plan?

  See section 3.4.3.2, Effects of Alternative 2 (Proposed Action) on Air Quality.

- Will the combustion of the polyethylene plastic sheeting used to cover slash piles affect air quality or human health beyond the limits set by the Oregon Smoke Management Plan?

  See section 3.4.3.2, Effects of Alternative 2 (Proposed Action) on Air Quality.

1.4.1.2 Long-Term Maintenance

- How will the BLM maintain the reduced post-project fuel loads and prevent the accumulation of additional fuels?

  See section 3.3.2.2, Effect of Alternative 2 (Proposed Action) on Fire and Fuels.

1.4.1.3 Access

- How will the BLM access the proposed fuel reduction areas?

  See section 2.1.2, Proposed Action.

- Will the BLM need to construct roads or cross private property to reach the proposed fuels units?

  See section 2.1.2, Proposed Action.

1.5 Does the Proposed Project Conform with Land Use Plans and Other Documents?

This forest management/fuels reduction proposal is in conformance with the objectives, land use allocations, and management direction of the 1995 *Medford District Record of Decision and Resource Management Plan* (ROD/RMP) and any plan amendments in effect at the time this document is published.

This project also conforms with the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (Northwest Forest Plan) (1994).

The proposed action was designed to be consistent 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), Endangered Species Act (ESA) of 1973,

Clean Water Act (CWA) of 1987, Safe Drinking Water Act (SDWA) of 1974 (as amended 1986 and 1996), Clean Air Act (CAA) of 1990, and Archaeological Resources Protection Act (ARPA) of 1979.

1.6 What is the Decision Framework?

This EA will provide the information needed for the authorized officer, the Butte Falls Resource Area Field Manager, to select a course of action to be implemented for the Butte Falls Hazardous Fuels Reduction Project. The Butte Falls Resource Area Field Manager must decide whether to implement the Proposed Action as designed or whether to select the No Action Alternative. In choosing an alternative, the Field Manager will consider how well the alternative responds to the identified project need, along with the relative merits and consequences of each alternative related to the relevant issues.

The decision will also include a determination of whether or not the impacts of the proposed action are significant to the human environment. If the impacts are determined to be within those impacts disclosed in the Environmental Impact Statement (EIS) for the 1995 Medford District ROD/RMP or otherwise determined to be insignificant, a Finding of No Significant Impact (FONSI) can be issued and a decision implemented. If the significance of impacts are unknown or greater than those previously analyzed and disclosed in the EIS, then a project-specific EIS must be prepared.

2.0 What are the Alternative Ways of Accomplishing the Objectives?

2.1 Description of the Alternatives

2.1.1 No Action (Alternative 1)

The No Action Alternative describes a baseline against which the effects of the action alternative can be compared. This alternative describes the existing condition and the continuing trends in the Project Area. Under the No Action Alternative, fuels reduction treatments would not be implemented. Future fuels reduction in this area would not be precluded and could be analyzed under a subsequent EA.

Fire suppression activities would continue on Federal and non-Federal lands. The BLM has a master cooperative fire protection agreement with the Oregon Department of Forestry (ODF). This agreement gives the ODF responsibility for fire protection on all lands within the Project Area. The agreement directs the ODF to take immediate action to control and suppress all fires. Their primary objective is to minimize total acres burned while providing for firefighter safety. The agreement requires the ODF to control 94 percent of all fires before they exceed 10 acres.

2.1.2 Proposed Action (Alternative 2)

The BLM proposes to thin an estimated 7,900 acres by hand using chainsaws. The cut material on 7,000 acres would be hand piled and burned on-site when fuel moisture and weather conditions allow for the safe burning of material. The cut material on the remaining 900 acres of brush land along the Butte Falls

Figure 2. BLM lands before and after fuels reduction treatment.

Highway would be broadcast burned. In some areas, cut material could be removed from the site by hand for use as woody fuel (biomass) or special forest products. The BLM would implement follow-up maintenance burning or brushing 3 to 10 years after treatment for many of the acres treated.

The proposed 7,900 acres of thinning also include thinning in about 4,000 acres of riparian reserves. Thinning would occur in the portion of the reserves outside the 35- or 60-foot no-treatment buffers. Prescribed burns would not be ignited within the riparian reserve buffer but low intensity burns would be allowed to back into the buffer.

Access to hazardous fuels reduction units on BLM-administered lands would be from existing public roads (e.g., State, County, or BLM). For those fuels units on BLM land that are not accessible from existing public roads, the BLM would seek to obtain permission from the private landowner. The BLM has been coordinating with private landowners in those areas where access may be needed. No new roads would be constructed to implement this project.

Riparian reserve widths vary based on the fifth field watershed, type of stream, and site-potential tree length for that watershed. Table 2-1 outlines riparian reserve buffer widths and no-treatment buffers proposed for this project.

Table 2-1. Riparian Reserves and Required Project Specifications

Stream Type or Feature	Riparian Reserve Buffer*	No-Treatment Buffers (on each side of streams and around water bodies)
Fish-bearing	Two site potential trees	60 feet
Perennial	One site potential tree	60 feet
Intermittent (long-duration)	One site potential tree	35 feet
Intermittent (short-duration)	One site potential tree	No hand piles (or hand pile burning) within channel bottom.
Springs, seeps, wetlands, ponds	One site potential tree	60 feet

*The site-potential tree length for the Shady Cove/Rogue River and Gold Hill/Rogue River fifth field watersheds is 165 feet. The site-potential tree length for the Evans Creek fifth field watershed is 175 feet.

BLM fire and fuels management personnel would conduct post-treatment evaluations to determine the need for follow-up maintenance underburning or brushing. Follow-up maintenance underburning would involve the controlled application of fire to understory vegetation and downed woody material when fuel moisture, soil moisture, and weather and atmospheric conditions allow for the fire to be confined to a predetermined area at a prescribed intensity to achieve the planned resource objectives. Follow-up burning provides a low cost method to maintain reduced fuel loading and prevent accumulation of additional fuel. Maintenance underburning or brushing would occur within 3 to 10 years following initial fuels reduction treatments.

Forest land in the Project Area is characterized by two major plant community groupings–mixed conifer/interior valley/ grass and white oak-ponderosa pine/Manzanita-wedgeleaf/grass, as described and mapped in the 1994 PRMP/EIS. As vegetation conditions change through the treatment units, the appropriate fuels reduction prescription would be applied. Work would be accomplished using ecological principles to provide for retention of fire adapted species, retention of uncommon species, and promotion of fire resilient species.

2.1.2.1 Fuels Reduction Thinning

- Conifers and hardwoods more than 1 foot tall and less than 8 inches dbh (diameter at breast height) would be cut to a 25-foot by 25-foot spacing.
- Shrub species more than 1 foot tall and less than 12 inches in diameter (at 1 foot above ground level) would be cut to 45-foot by 45-foot spacing.
- Conifers 6 to 14 inches dbh would be pruned up to 10 feet above ground level.

2.1.2.2 Hand Piling and Pile Burning

- Slashed material that measures 1 to 8 inches in diameter and more than 2 feet long would be hand piled.
- The size of the slash pile would normally be 6 feet by 6 feet with an average of 50 piles per acre.
- Slash piles would be covered with 4 mil polyethylene plastic sheets no bigger than 10 feet by 10 feet.
- Slash pile burning would generally occur within 1 to 1.5 years after cutting, or when fuels have cured to allow for a hotter, cleaner burn.
- Slash piles would generally be burned between October 15 and May 1 after significant precipitation (minimum of 1 inch of rain within 72 hours) has occurred to limit the fire from creeping between piles and to minimize the potential of fire escape and damage to residual stands. Scars from slash pile burning would be less than 4 percent of the treatment area on average.

2.1.2.3 Broadcast Burning

- Shrub species more than 1 foot tall and less than 12 inches in diameter (at 1 foot above ground level) would be burned.
- Slash would be burned between October and May using low to moderate intensity fire.

2.2.2.4 Maintenance Thinning and Underburning

- Fuel hazard reduction units would be thinned by hand or with fire 3 to 10 years following the initial treatments.
- Maintenance thinning could include cutting hardwood and shrub species sprouts greater than 18 inches high and less than 2 inches in diameter to the 2 most dominant stems.
- Follow-up underburning would generally occur in the spring or fall.

2.2 Alternative Considered but Eliminated

During the review of internal and public issues, and development of the alternatives, the project ID Team considered a variation of the Proposed Action. The following alternative was considered but then eliminated from detailed study.

2.2.1 Machine Mastication

Machine mastication is a mechanical fuel treatment used to thin and crush dense, nonmerchantable (less than 8 inches in diameter) vegetation in forest stands. It is an economical alternative to thinning, hand piling, and burning brush ($500 per acre versus $1200 per acre). It is an effective tool for lowering the fuel bed depth and removing a large portion of ladder fuels. The crushed (or shredded) vegetation is left close to the ground which can accelerate decomposition and seems to delay the regeneration of brush (i.e., fuels).

The BLM fuels specialist considered the fuels units along the Butte Falls Highway to be good candidates for machine mastication because the area is relatively flat (less than 35 percent slope) and it has very little timber overstory that could be damaged by the mastication equipment. However, the BLM project soil scientist discovered a portion of those units were located on clay soils designated in the 1995 ROD/RMP(p. 155) as fragile soils that are sensitive to surface-disturbing activities. After the proposed fuels treatments on the fragile soils changed to broadcast burning, less than 100 acres remained available for machine mastication. At this point, it became uneconomical to bring in a machine masticator and mechanical fuel treatment was dropped as an alternative. Dropping the machine mastication alternative also served to address a concern raised by the public regarding the impacts of machine mastication on Neotropical migratory birds.

2.3 Project Design Features

Project Design Features are an integral part of the Proposed Action and have been developed to avoid or reduce the potential for adverse impacts to resources. The following Project Design Features (PDFs) are included in this project.

2.3.1 Prescribed Burning

1. Conduct prescribed burns under moderated weather conditions when soil moisture is elevated in order to reduce surface fuel loading in the 0- to 3-inch diameter size class by 60 to 80 percent.

Whenever possible, burning would be planned during conditions that would allow heavier fuels to remain on-site and not fully consume.

2. Develop an approved prescribed fire plan for all prescribed burn units prior to ignition and in compliance with the Interagency Prescribed Fire Planning and Implementation Procedures Guide (http://www.fs.fed.us/fire/fireuse/rxfire/rxfireguide.pdf). The prescribed burn plan would contain measurable objectives, a predetermined prescription, and contingency plan to be implemented in the event of an escaped burn.

3. Monitor burning conditions closely to prevent fire escape and to minimize damage to residual trees and vegetation.

2.3.2 Soil

4. Conduct broadcast burning only when soil moisture is sufficient (generally greater than 35 percent) to prevent consumption of the duff layer. Duff consumption in a burn unit should not exceed 2 to 10 percent for low to moderate burns (1995 ROD/RMP, p. 169).

5. Construct water bars on firelines according to District spacing guidelines (1995 ROD/RMP, 167).

6. Construct all firelines by hand.

7. Rehabilitate all firelines and water bars constructed for this project that intersect existing roads or trails to the extent that unauthorized off-highway vehicle (OHV) use is discouraged. This could include dragging cut vegetation over the lines, seeding, or mulching to hide the firelines at points where they intersect roads or existing trails.

8. Do not hand pile slash (or burn hand piles) in the channel bottom of short-duration intermittent streams, or within the draw bottom of dry draws.

9. Disperse piles across treatment areas. Whenever possible, pile burning would be planned and scheduled when surrounding vegetation and organic material moisture content is enough to maintain an unburned ring of woody material on the ground surrounding the burn pile. This helps to prevent exposed soils from moving beyond the burn pile site.

10. Close all natural surface roads opened during fuel hazard reduction prior to the wet season.

2.3.3 Riparian Reserves

11. Do not introduce wetting agents (i.e., foam) into springs, riparian areas, or stream courses.

12. Refuel and maintain equipment (e.g., drip torches, chainsaws) a minimum of 100 feet from waterbodies and wetlands.

13. Ignite prescribed burns outside riparian buffers.

14. Allow low intensity prescribed burns to back into riparian reserves

15. Limit fireline construction inside riparian reserves.

16. Where firelines *are* constructed in riparian reserves, construct by hand and place slash or other native mulch materials on firelines to provide 80 percent effective ground cover.

17. Water bar and rehabilitate firelines adjacent to or within riparian reserves after completion of prescribed burns.
18. No treatment or pile burning would occur within 60 feet, each side, of fish-bearing or perennial streams.
19. No treatment would occur within 35 feet, each side, of long-duration, intermittent streams.
20. No treatment would occur within 60 feet from the edge of springs, seeps, wetlands, and ponds.
21. Prohibit the removal of material for firewood, poles, or other special forest products within riparian reserves.
22. Ensure fuels treatments within riparian reserves would not result in less than 50 percent canopy cover post-treatment.
23. Exclude fuels treatments from inner gorge slopes 35 percent or greater along all streams.

2.3.4 Silviculture

24. In pine series forests, hand pile and burn thinning slash outside the driplines of individual pine trees.
25. Perform prescribed burns when moisture conditions are high enough and prescription windows are at a level so that no more than 50 percent of the mound depth/duff layer around pine trees is consumed during burning.
26. Ensure no more than 25 percent of the pine tree live crown is scorched for trees 8 inches DBH and larger.
27. Implement prescribed burning when soil and duff moisture and weather conditions allow for low intensity burning in order to minimize tree stress and adverse effects on tree roots and foliage.

2.3.5 Wildlife

28. Do not operate chainsaws within 195 feet of any northern spotted owl nest site or activity center of known pairs and resident single between March 1 and June 30 (or until two weeks after the fledgling period) unless protocol surveys have determined owls are not occupying the activity center, are not nesting, or have failed in their nesting attempt.
29. Restrict burning from March 1 to June 30 within 0.25 miles of northern spotted owl nests.
30. Retain all snags unless they need to be felled for worker safety.
31. Leave approximately 10 percent of each unit untreated. This would include untreated riparian buffers and special status plant and wildlife buffers.
32. Leave 2 to 4 piles per acre unburned to provide wildlife habitat.
33. Buffer special status wildlife species sites according to the management recommendations for that species in effect at the time of treatment. Buffer size and strategy would depend on site-specific conditions, proposed treatments, and species involved. Fuels treatment could take place within those buffers if the species or specific habitat characteristics would not be adversely impacted.

2.3.6 Special Status Plant Species

34. Buffer special status plant sites according to the management recommendations for that species in effect at the time of treatment. Buffer sizes would be determined based on species, proposed treatments, and site-specific environmental conditions.

35. Understory burning may occur through some vascular plant sites during plant dormancy, with approval from the BLM botanist.

36. For *Fritillaria gentneri* sites:

    - Understory burning through buffered occurrences may only occur during the dormancy period (July through February).
    - Apply a minimum 25-foot buffer from the population occurrence boundary for fuels hazard reduction hand treatments. Thinning by hand may be allowed through the buffer if work is completed during the dormancy period. Maintain a minimum 40 percent tree and shrub canopy cover within the buffer and pile all cut material outside the buffer.
    - Hand pile slash a minimum of 25 feet from the buffer edge.

2.3.7 Noxious Weeds

37. Operate motorized vehicles and equipment on existing roads and trails.

38. Continue to treat noxious weeds on BLM-administered lands through the regular program of work with subsequent treatments as necessary and as funding is available, prior to fuels treatments.

39. Apply seed from native plant species on burn pile scars and broadcast burn areas in units containing noxious weed populations.

40. In Old Ferry Road and Butte Falls Highway treatment units, retain patches of understory vegetation identified by the BLM project botanist where high infestations of Yellow star-thistle and Scotch broom occur.

2.3.8 Air Quality

41. Implement prescribed burns in accordance with the Oregon Smoke Management Plan to reduce emissions and avoid smoke intrusions into designated areas.

42. Complete fire mop-up as soon as practical to reduce potential level of smoke emissions.

43. Cover hand piles to permit burning during the rainy season and to ensure lower fuel moisture to facilitate quick and complete combustion while reducing smoke emissions. If covers would not be removed prior to burning, only polyethylene sheeting no more than 100 square feet in size and no more than 4 mils thick [Oregon Administrative Rule 629-048-0210(4)] may be used.

44. Burn during the rainy season when there is a stronger possibility of atmospheric mixing to allow for better smoke dispersion. All burning would be completed after proper clearances have been provided by the Oregon Department of Forestry.

2.3.9 Cultural Resources

45. Buffer known cultural sites with flagging prior to project implementation. No treatments, including fire line construction, prescribed burning, hand piling or hand pile burning would occur within the flagged boundaries of the recorded cultural resources.

46. Fall trees away from cultural resource site buffers.

47. If any cultural sites, not located during the cultural resource survey, are found during project implementation, activities around the site would halt until a BLM archaeologist reviewed the site and determined appropriate protection measures.

2.4 Effects on Critical Elements of the Human Environment

2.4.1 Air Quality

The Project Area is not located within a Class I designated airshed or Smoke Sensitive Receptor Area. Pile burning is not expected to affect visibility within Crater Lake National Park and other smoke sensitive Class I areas (Kalmiopsis and Rogue wildernesses). Prescribed burning emissions are not expected to adversely affect annual PM10 attainment within the Grants Pass and Medford/Ashland nonattainment areas. The prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan and the Visibility Protection Plan (OAR 340-200-0040, Section 5.2). Impacts to air quality would be localized and of short duration because hand pile burning would be completed in accordance with the Oregon State Implementation Plan, Oregon Smoke Management Plan, and Visibility Improvement Plan. The Project Area is 5 miles or more from the cities of Grants Pass and Medford/Ashland air quality maintenance areas and burning activities would have no effect on those areas. Pile burning would occur during unstable atmospheric conditions primarily from October to May to avoid periods of air stagnation.

2.4.2 Area of Critical Environmental Concern

The Butte Falls Hazardous Fuels Reduction Project would not affect an area of critical environmental concern (ACEC). The Table Rocks ACEC is located in the Gold Hill/Rogue River fifth field watershed; however, no fuels projects are proposed within the ACEC.

2.4.3 Cultural Resources

The BLM has completed or will complete cultural surveys following Oregon BLM/State Historic Preservation Office protocol. The Medford District Archaeologist assessed the project as “No Effect Determination, no significant resources and/or resources avoided.”

The following PDFs were included in the EA to help avoid impacts to cultural resources:

- Buffer known cultural sites with flagging prior to project implementation. No treatments, including fire line construction, prescribed burning, hand piling or hand pile burning will occur within the flagged boundaries of the recorded cultural resources.
- Fall trees away from cultural resource site buffers.

- If any cultural sites, not located during the cultural resource survey, are found during project implementation, activities around the site would halt until a BLM archaeologist reviewed the site and determined appropriate protection measures.

2.4.4 Environmental Justice

The Butte Falls Hazardous Fuels Reduction Project is not expected to have substantial effects on minority or low income populations because the projects are not located in areas of minority or low income populations. In addition, small or minority-owned businesses would have the opportunity to compete for some of the work. No responses were received to identify concerns.

2.4.5 Farm Lands (prime or unique)

No prime or unique farm lands would be affected. Hazardous fuels treatment would only occur on densely vegetated lands.

2.4.6 Floodplains

The hazardous fuels treatment would not involve occupancy or modification of floodplains, would not support floodplain development, and would not increase the risk of flood loss. As such, the proposed action is consistent with Executive Order 11988, Floodplain Management.

2.4.7 Invasive, Nonnative Species

Noxious weed populations detected in the proposed fuels reduction units are puncturevine, rush skeletonweed, scotch broom, yellow star-thistle, and English ivy. Bull thistle and Himalayan blackberry also occur in the Project Area, although they have been reported irregularly. Both are category “B” species which the BLM does not treat because they are so widespread it would be impractical.

Workers could transport seeds on their clothing or equipment from roadside noxious weed populations into the units during fuels reduction activities. Seeds could also blow into or be transported via wildlife into newly treated areas. Removing vegetation in the units could increase the risk of noxious weed spread from adjacent areas. Treating these populations prior to implementation of fuels reduction work would reduce this risk.

The use of PDFs and ongoing noxious weed treatments in the Butte Falls Resource Area would minimize cumulative effects of fuels reduction activities on noxious weeds.

2.4.8 Native American Religious Concerns

The Project Area contains no known sites that are sacred to Native Americans. The BLM sent scoping letters to the Confederated Tribes of Siletz, Cow Creek Band of Umpqua Tribe of Indians, and The Confederated Tribes of Grand Ronde. No responses were received to identify concerns.

2.4.9 Threatened or Endangered Species

2.4.9.1 T&E Plant Species

All proposed fuels reduction units, except Pleasant Re-fry, are within the range of *Fritillaria gentneri*. Many of the units contain suitable habitat. Because the BLM has or will meet the required Project Design Criteria prior to project implementation, this project "**may affect**, but is **not likely to adversely affect**" the T&E plant *Fritillaria gentneri*. Although some of the proposed fuels units are within the range of *Limnanthes floccosa* ssp. *grandiflora*, they do not contain habitat for this Endangered species and surveys have not discovered any populations on BLM-administered lands in the Butte Falls Resource Area. No proposed fuels units are within the range of or contain suitable habitat for *Lomatium cookii*. Proposed fuels reduction activities would be "**no affect**" to *Limnanthes floccosa* ssp. *grandiflora* or *Lomatium cookii* because no plants occur in the Project Area.

2.4.9.2 T&E Fish Species

The proposed action would have a "No Affect" determination on Southern Oregon/Northern California (SO/NC) coho salmon and coho critical habitat because implementation of PDFs would limit soil movement and disturbance. The BLM would implement 60-foot no-treatment buffers on all perennial and fish-bearing streams and 35-foot no-treatment buffers on long duration intermittent streams.

2.4.9.3 T&E Wildlife Species

Within the Butte Falls Resource Area, there are two wildlife species on the USFWS T&E list: Northern spotted owl and vernal pool fairy shrimp. The Project Area is outside the range of the vernal pool fairy shrimp. The proposed fuels treatments are within the range of the northern spotted owl. Proposed fuels reduction units are within 0.25 miles of 6 known owl sites; 3 of the sites have been vacant for 3 or more years. The Project Area is approximately 50 percent dispersal habitat and 2 percent Nesting/Roosting/Foraging (NRF) habitat. The remaining 48 percent does not provide habitat for the northern spotted owl. The proposed treatments "**may affect, but is not likely to adversely affect**" the northern spotted owl because it would not remove or downgrade dispersal or NRF habitat and would not alter known, 300-meter nest patches.

2.4.10 Wastes, Hazardous or Solid

Actions proposed in this project would not generate any hazardous or solid wastes. In addition, the Project Area contains no known historical sites with the potential to contain hazardous materials. BLM employees conducting field work in the Project Area have not encountered any illegal dumping of hazardous materials. If hazardous materials are discovered during the project implementation, applicable State and Federal laws would be followed to protect human health and the environment.

During project implementation, Oregon Department of Environmental Quality guidelines for spill prevention and containment of petroleum products would be followed (Oregon Administrative Rules, Chapter 340, Department of Environmental Quality, Division 142, Oil and Hazardous Materials Emergency Response Requirements).

2.4.11 Water Quality

The proposed action would not affect water quality in streams within the Project Area due to the implementation of PDFs and no-treatment buffers on perennial and long duration intermittent streams. Water quality would be maintained on 303(d) listed streams.

2.4.12 Wetlands/Riparian Zones

A 60-foot no-treatment buffer on perennial and fish-bearing streams and a 35-foot no-treatment buffer on long duration intermittent streams would be implemented, reducing the total amount of treated acres. The no-treatment buffers would allow fuels reduction on the outside edge of the riparian reserves where upland conditions exist while maintaining the true riparian vegetation in the buffers. No-treatment buffers would minimize the potential for stream sedimentation after hand pile burning, underburning, or broadcast burning, when soil is exposed and has the potential for movement. Short duration intermittent streams and dry draws would have no hand piles (or hand pile burning) within channel bottoms.

The proposed action would not result in the destruction, loss, or degradation of any wetland. As such, the proposed action is consistent with Executive Order 11990, Protection of Wetlands.

2.4.13 Wild and Scenic Rivers

The proposed action is located within a few small portions of two eligible wild and scenic rivers, the Rogue River near Trail and Gold Hill, and Sams Creek near Gold Hill. The outstandingly remarkable value identified for Sams Creek is fish; the outstandingly remarkable value identified for the Rogue River is fish and recreation. The proposed action is not expected to impact the outstandingly remarkable values for these two river segments. The project design features and best management practices, such as no-treatment buffers on perennial stream channels, hand treatments instead of machine treatments, only small diameter trees cut, and no treatment of inner gorges greater than 35 percent slope, would result in no negative effects to eligible wild and scenic rivers or wild and scenic river values.

2.4.14 Wilderness

No designated wilderness areas are located in or near the Project Area.

3.0 What are the Consequences on the Affected Environment, Changes to Existing Conditions, and Trends for the Alternatives under Consideration?

Chapter 3 describes the current condition of the environment within the Project Area. This information provides the baseline for determining the effects of the Proposed Action. Past activities have contributed to the conditions currently existing in the Project Area and are reflected in the description of the current conditions. This chapter is organized by the resources most likely to be affected by the Proposed Action. After each resource's affected environment description, the potential impacts of each alternative are analyzed under the same resource heading.

3.1 Introduction

3.1.1 Land Use Allocations, Resource Program Allocations, and Other Land Uses

The 1995 Medford District ROD/RMP provides management actions and direction for the major land use allocations derived from the Northwest Forest Plan and other resource programs allocations of the RMP.

The following land use allocations found in the three fifth field watersheds containing the Project Area: matrix (including connectivity/diversity blocks) and riparian reserves. Fuel hazard reduction is proposed in both land use allocations.

Resource program allocations include deer and elk winter range, visual resource management Classes II, III and IV, eligible wild and scenic rivers, area of critical environmental concern (ACEC), and grazing allotments.

Fuel hazard reduction units are proposed in deer and elk winter range near Shady Cove. For more information and an analysis of potential impacts, see section 3.9, Wildlife.

Within the three fifth field watersheds containing the Project Area, the 1995 ROD/RMP listed Sams Creek, a portion of the Rogue River (Segment 2), and Rogue River (Segment 3) as eligible for designation as wild and scenic rivers. These eligible rivers are located in the Gold Hill/Rogue River and Shady Cove/Rogue River fifth field watersheds. All three rivers were eligible for potential classification as recreational. The outstandingly remarkable value identified for Sams Creek was fish. The outstandingly remarkable values identified for the two segments of the Rogue River were fish and recreation. "[A]ll authorized action on BLM-administered land within the one-half mile wide corridor must have either a positive or neutral effect on identified outstandingly remarkable values" that resulted in rivers being found eligible (1995 ROD/RMP, p. 69). Fuel hazard reduction units are proposed along Sams Creek and along the Rogue River (Segment 3) near Gold Hill and Shady Cove.

The Table Rocks ACEC is located in the Gold Hill/Rogue River fifth field watershed but no fuels projects are proposed within the ACEC.

The three fifth field watersheds containing the Project Area include multiple grazing allotments. However, hazardous fuels reduction projects are proposed only within the following grazing allotments: Crowfoot, Vestal Butte, Derby Road Sawmill, Bull Run, Reese Creek, Section 7, and Meadows.

3.1.2 Other Actions in the Watersheds containing the Project Area

3.1.2.1 Past Actions

The Butte Falls Resource Area has completed approximately 2,486 acres of hazardous fuels reduction work within the Lower Evans, Pleasant Creek, Sams Creek, and Snider Creek sixth field subwatersheds. Hazardous fuels reductions were completed by hand and consisted of understory vegetation thinning, hand piling the slash, and hand pile burning. In addition to hazardous fuels reduction on BLM-administered land, private landowners have treated hazardous fuels around their homesites. The amount and location of these treatments are unknown.

The BLM harvested approximately 2,400 acres of timber between the years of 1995 and 2000. Harvest treatments consisted of commercial thin, density management, overstory removal, select cut, mortality salvage, and regeneration harvest. Yarding systems used for harvesting were tractor, cable, and helicopter.

On private industrial lands, past harvest activities have ranged from partial harvests to clear-cuts. Most private industrial lands have been harvested over the past 60 years. In these stands, management objectives are designed to maximize volume growth per acre and maintain fast growing conifer trees.

Wildfires have played a key role as a natural disturbance process in the three watersheds containing the Project Area. Over the past 60 years, 24 wildfires more than 100 acres in size have burned through private and public lands in these watersheds (Table 3-1).

Figure 3. The Hull Mountain Fire burned nearly 8,000 acres in 1994.

Table 3-1. Notable Wildfires in the Evans Creek, Gold Hill/Rogue River, and Shady Cove/Rogue River Fifth Field Watersheds

Fifth Field Watershed	Fire Name	Year	Acres Burned
Evans Creek	Sykes	1987	9,200
	Sykes Creek #1	1955	3,800
	Angel	1987	3,700
	Grave Creek	1978	2,900
	Sprignett Butte	1994	1,700
	Pleasant Creek	1987	1,200
	Ramsey Canyon	1994	160
	Maple Gulch #1	1952	150
Evans Creek and Gold Hill/Rogue River*	East Evans	1994	10,100
	Hull Mountain	1994	8,000
	Antioch	2000	330
	Ward Creek	1972	160
Gold Hill/Rogue River	Savage Creek	1987	3,500
	Blackwell Hill	1955	3,500
	Jackson Creek 1	1955	2,500
	Tinpan 81	1981	2,300
	Upper Table Rock	1980	950
	Tinpan 93	1993	550
	Neil Rock	2002	160
	Nugget Butte 1	1955	120
	Log Deck	1974	120
	Savage Spot	1987	100
Shady Cove/Rogue River	Johnson Ford	1963	380
	Indian Creek	1994	220

*These fires burned portions of both watersheds.

3.1.2.2 Future Actions

The BLM anticipates future activities in the watersheds containing the Project Area will include continued forest management on private industrial lands. Future proposed harvest on BLM lands within the next 5 years would continue to implement the Medford District's existing ROD/RMP and includes timber sales proposed in the Evans Creek fifth field watershed. These sales could be a combination of regeneration, selection harvest, density management, and thinning treatments on matrix lands. Treatments would be considered on approximately 2,000 acres. Thinning would be considered in riparian reserves within the thinned timber stands. Logging systems used for harvesting this timber could include tractor, skyline cable and helicopter yarding. These logging systems would be based on Best Management Practices (BMPs) as described in the ROD/RMP.

3.2 Vegetation

The scale of analysis for vegetation is the acres proposed for fuels hazard reduction.

3.2.1 Affected Environment

Forest land in the Project Area is characterized by two major plant community groupings: mixed conifer/interior valley/grass and white oak-ponderosa pine/Manzanita-wedgeleaf/grass, as described and mapped in the *Medford District Proposed Resource Management Plan/Environmental Impact Statement* (PRMP) 1994.

- White oak-ponderosa pine/Manzanita-wedgeleaf/grass (includes Oregon white oak and ponderosa pine series): These communities were originally pine-oak savannahs with either manzanita or wedgeleaf brush or perennial grass species dominant, depending on fire frequency. Madrone is locally present (PRMP/EIS, p. 3-28). The Oregon white oak series is found along the valley floor at low elevations. Although it occurs on all slope positions and aspects, it is more commonly found on southerly aspects and is slightly more common in valley bottoms. The ponderosa pine series is common in areas with low summer rainfall and is generally tolerant of moisture stress. It is found near the valley bottom at slightly higher elevations than the Oregon white oak series. Ponderosa pine regeneration is stimulated by fire and controlling fires restricts regeneration (Atzet et al. 1996, p. QUGA4 1 and PIPO 1).
- Mixed conifer/interior valley/grass (includes Douglas-fir and ponderosa pine series): Conifer species of late and mature seral stages are Douglas-fir and ponderosa pine. Tree-form hardwoods are present. This plant grouping has only limited areas that can be considered old growth (200+ years) forest (Table 3-2). A high fire return frequency, coupled with the mortality patterns common to low elevation dry sites, acts to keep this plant grouping in younger age classes (PRMP/EIS, p. 3-29). Overstory presence of Douglas-fir indicates disturbance, while presence and dominance in the understory can indicate hot, dry conditions. Except for the isolated occurrences of climax stands of Oregon white oak and ponderosa pine, the Douglas-fir and ponderosa pine series occurs in the hottest, driest forest environment in southwestern Oregon (Atzet et al. 1996, p. PSME 1).

Table 3-2. Plant Types/Series in Project Area

Plant Type/Series	Acres	Percent of Total
Conifer and Mixed Conifer (primarily Douglas-fir and ponderosa pine series)		
5-79 years	1,820	23
80-199 years	3,160	40
200+ years	527	7
Conifer and Mixed Conifer Total	**5,507**	**70**
Oak Woodland/Shrub/Grass (white oak series)	**1,720**	**22**
Nonforested (rock openings, roads, utility corridors)	**673**	**8**
Project Area Total	**7,900**	**100**

These plant groupings are low elevation, low rainfall in comparison to the majority of the forested areas in the Butte Falls Resource Area. The proposed fuels hazard reduction units have elevations ranging

from 1,200 feet in the Sardine Creek and Gold Hill vicinity to 3,500 feet in the Fielder Mountain and Rogue River area. Annual precipitation varies from 20 inches in the lower elevations to 40 inches in the higher elevations. The mixed conifer grouping tends to be found in the elevations above 2,000 feet with the white oak-ponderosa pine grouping found below 2,000 feet; however, the white oak-ponderosa grouping on southerly aspects can range up to 3,000 feet. The majority of the Project Area is within the mixed conifer grouping, Douglas-fir series. Both plant groupings are indicative of a hot, dry summertime forest environment; the white oak-ponderosa pine grouping has the harsher climatic conditions of the groupings.

Both major plant groupings are found in the three watersheds containing the Project Area. Overstory density varies in the proposed fuels hazard reduction units. Lower elevation and southerly aspects generally have scattered ponderosa pine with white oak and black oak. Higher elevation and northerly aspects have Douglas-fir and scattered ponderosa pine with varying densities but generally with 40 percent or greater canopy cover.

Within the Project Area, the loss of the natural thinning effects of wildfire has lead to the development of overstocked, stagnant stands, especially in the understories. Woody shrub species are dominant at lower elevations with greater conifer densities, particularly Douglas-fir, at higher elevations. Past harvest in stands with road access, primarily in the form of mortality salvage and removal of individual overstory trees of commercial value, has also contributed to high understory densities of stagnant conifers, hardwoods, and woody vegetation. Finally, some areas with very few large overstory trees in the Project Area are a result of past wildfires. Hardwoods, conifers, and shrubs less than 40 years old form dense stands. Competition for site resources, especially water, is most severe in the low elevation, low rainfall areas. The white oak-ponderosa pine community, which occupies these sites, is adapted to these conditions; however, periodic fire is part of that adaptation. The greater understory vegetation densities have created conditions that stress existing overstory trees competing for limited resources in both plant groupings. The supply of essential site resources has decreased while the demand has increased. In the absence of disturbance events such as wildfire or thinning, the number of trees per acre remains at levels above the carrying capacity of the site (Oliver 1996).

Approximately 7,900 acres are proposed for fuels hazard reduction in the Project Area. About 3,800 acres (48 percent) are considered “withdrawn” from the commercial timber base through the Timber Production Capability Classification due to environmental conditions. These sites are withdrawn for various reasons including excessive surface rock, reforestation delays, and low site potential for conifer growth. The remaining 4,100 acres in the commercial timber base are at the lower end of the growth and yield projections due to environmental factors, primarily low rainfall, when compared to the majority of the commercial timber lands of the Butte Falls Resource Area. On all sites, stands with more vegetation than the site has moisture, nutrients, and growing space to sustain, have reduced tree growth and vigor and increased probability of tree mortality from insects or disease.

3.2.2 Environmental Consequences

3.2.2.1 Effects of Alternative 1 (No Action Alternative) on Vegetation

Direct, Indirect, and Cumulative Effects

Under the No Action Alternative, understories in stands of both plant groupings would remain in a high density condition. Woody shrub species dominant at lower elevations and conifer densities, particularly Douglas-fir, at higher elevations would remain in overstocked conditions. The greater understory

vegetation densities would continue to stress existing overstory trees competing for limited resources in both plant groupings and competition for limited resources, particularly moisture, would remain high. "Current high densities of understory trees may also contribute to water stress in large old-growth trees that could make them susceptible to insect related mortality" (Latham and Tappeiner 2002, p. 1).

3.2.2.2 Effects of Alternative 2 (Proposed Action) on Vegetation

Direct and Indirect Effects

Implementation of Alternative 2 would reduce the density of understory vegetation in stands of both plant groupings. Woody shrub species densities, dominant at lower elevations, and conifer densities, particularly Douglas-fir, at higher elevations would be reduced. Competition for limited resources, especially moisture, among residual understory trees would be reduced and moisture stress on existing overstory trees would be decreased by thinning and reducing the density of understory vegetation.

In the ponderosa pine series, "[p]onderosa pine regeneration is stimulated by fire, and controlling fire restricts regeneration" (Atzet et al. 1996, PIPO 1). Understory thinning and subsequent maintenance underburning would encourage native ponderosa pine regeneration in stands that are presently dominated by more shade-tolerant species such as Douglas-fir. This would help maintain stand health in the ponderosa pine series in both plant groupings.

Stands in the Douglas-fir series would also benefit from reduced competition for limited moisture from reduced understory densities. "Thinning old growth stands may reduce the threat of stand-replacing fires and increase resource availability to large old-growth trees, which in turn may prolong their lives by reducing the effects of competition" (Latham and Tappeiner 2002, p. 1). While 63 percent of the stands proposed for treatment are not considered old-growth, the existing overstories can still benefit from increased resource availability through reduced understory competition.

Oregon white oak trees in the white oak series would also benefit from the proposed stand density reduction. "Clearly, it [Oregon white oak] is not tolerant of over-topping by Douglas-fir and associated conifers" (Stein 2009, pg 8). Proposed treatment would reduce understory densities of woody vegetation and conifers, such as Douglas-fir. Historic fire frequency tended to maintain the white oak series domination by white oak trees; ". . . fires–natural as well as those set by Indians–maintained these open conditions" (Stein 2009, p. 9).

Project design features to limit consumption of the duff layer around residual overstory trees to less than 50 percent and crown scorch to no more than 25 percent would temporarily reduce the live surface root volume of residual overstory trees with reduced tree growth in the first year. Subsequent improved growth would occur in following years as fine roots are replaced and competition for moisture and nutrients is reduced. Studies have shown that prescribed underburning had "reduced radial growth in the first year following fire but increased growth in the next 7 years" (Reinhardt and Ryan 1988, p. 1). In ponderosa pine stands, "ten years after implementing restoration treatments, mean individual tree basal area increment (BAInc10) and growth efficiency (GE) were significantly higher for treated units relative to Control units; all three age-classes (<50 yrs, 50-100yrs, > 100 yrs) benefited similarly from restoration treatments relative to the Control, with the greatest response in the Cut-only and moderate response in the Cut-burn" (Fajardo et al. 2007, p. 50). Mortality to individual residual trees may occur and growth reduction, to the residual stand, is likely through the first year after burning; however, stand vigor and growth would be improved for at least 2 to 10 years across all plant series through the proposed action.

Cumulative Effects

The lack of fire within these stands has created the need for fuels reduction treatments on these acres. Approximately 7,900 acres are proposed for treatment in this project. Almost 4,200 acres are dominated by the Douglas-fir series, approximately 1,300 acres are dominated by the ponderosa pine series, and approximately 1,700 acres are dominated by the white oak series. There is overlap between these series, particularly with ponderosa pine integrated in the Douglas-fir series, and ponderosa pine intermixed with the white oak series. The proposed action would reduce competition for limited resources, particularly moisture, and improve the health of residual stands across all plant series and groupings, and in all seral stages. Lands in the white oak and ponderosa pine series would receive the benefit of maintaining the seral progression of those species as the dominant overstory and understory species. The overall effect on approximately 7,900 acres proposed for treatment would be to maintain all 3 plant series in a healthy condition with reduced risk of stand-replacing fire and the potential for increased growth in the residual stands.

3.3 Fire and Fuels

3.3.1 Affected Environment

3.3.1.1 Fire Regime and Condition Class

Fire regime refers to the frequency, severity, and extent of fires occurring in an area. Climate and topography combine to create the fire regime found throughout the Project Area. Agee (1993) suggests that variable fire history, complex geology, land use history, and steep environmental gradients of Douglas-fir hardwood forests of the southwest Oregon and northern California Siskiyou Mountains prevents generalizations about fire and its ecological effects. This is also true for the lower to middle elevations in the Project Area which is characterized by steep terrain, Douglas-fir and pine forest types, and a history of the use of fire by humans. However, plant association groups are a credible link to historic ecological process, including fire regimes that occurred on sites in the past (Franklin and Agee 2003). Historic fire regimes and the subsequent departure from them are correlated with the change from historical to current vegetative structure. The change in vegetation also helps to describe the difference in fuel loading from historical to current conditions.

These changes in vegetation and fuel conditions help to determine the expected change in fire behavior and its effects. This difference in many respects is attributed to fire exclusion, but also includes all human practices that would affect the extent, severity, or frequency of fire events compared to historical accounts. These practices include road building, livestock grazing, and some logging practices as well as fire suppression.

Three historic fire regimes are found within the Project Area. **Fire Regime 1**, characterized by a 0- to 35-year historical fire return interval, typically burned with low severity; large stand-replacing fires under certain weather conditions, but were rare events (i.e., every 200 years). **Fire Regime 2**, characterized by a 0- to 35-year historical fire return interval, typically burned with moderate to high severity. Fire Regime 2 includes true grasslands and savannahs with typical fire return intervals of less than 10 years and ceanothus and Oregon chaparral with typical fire return intervals of 10 to 35 years. **Fire Regime 3**, characterized by a historical fire return interval of generally less than 50 years, typically burned with mixed severity. Fire Regime 3 includes mixed conifer and very dry, west-side Douglas-fir.

This regime usually results in mixed landscapes. Large, stand-replacing fires may occur but were usually rare events.

Condition classes are a function of how much the current fire regimes have departed from historical fire regimes resulting in alterations of components such as species composition, structural stage, stand age, and canopy closure. There are three condition classes:

Condition Class 1 - Fire regimes are within or near an historic range. The risk of losing key ecosystem components is low. Vegetation species composition and structure are intact and functioning within an historical range.

Condition Class 2 - Fire regimes have been moderately altered from their historical range (more than one return interval). This change results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns.

Condition Class 3 - Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. This change results in dramatic changes to fire size, frequency, severity, or landscape patterns.

Plant communities, such as ponderosa pine and woodlands (fire regime 1), proposed for treatment in the Project Area are primarily in Condition Classes 2 and 3. The pine sites proposed for treatment have a dense understory of Douglas-fir and brush due to the absence of fire and the hardwood woodlands have a dense brush understory.

The dry, west-side Douglas-fir stands (fire regime 3) proposed for treatment are primarily in Condition Class 2. Small portions of these stands are in Condition Class 1 and 3. Stands are extremely dense due to the absence of fire. The shrublands (fire regime 2) are in Condition Class 2 and 3(Figure 4).

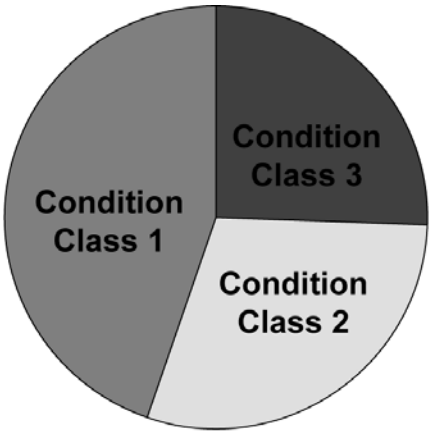

Figure 4. Fire Regime Condition Class ratings for BLM lands in the sixth field watersheds containing proposed fuels hazard reduction projects.

3.3.1.2 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 the identification of broad areas within a watershed that could benefit from fuels management treatment. Hazard ratings were developed for the resource area. In general the existing fuel profile within the Project Area represents a moderate to high resistance to control under average climatic conditions. Figure 5 summarizes the percent acres of BLM land in each fire hazard rating category for the Butte Falls Resource Area. This data is from the Jackson County Fire Risk Analysis.

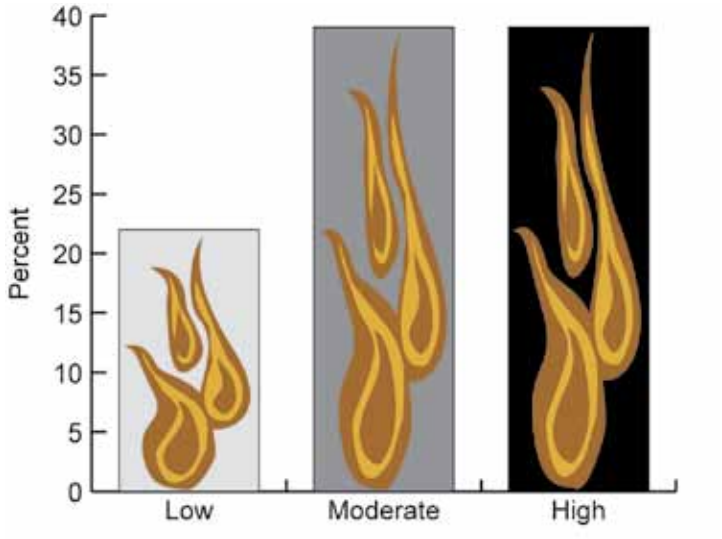

Figure 5. Fire hazard ratings for BLM lands in the Butte Falls Resource Area.

3.3.2 Environmental Consequences

3.3.2.1 Effects of Alternative 1 (No Action) on Fire and Fuels

Direct and Indirect Effects

Under the No Action Alternative, there would be no treatment of existing surface or ladder fuels to help mitigate the effects of wildfire. Fuels would continue to accumulate on the forest floor. The departure from the historic fire regime would continue to trend towards condition class 2 and 3. The majority of the Project Area would remain in moderate to high fire hazard resulting in a continued high probability that when a wildfire occurs, there will be a higher potential for increased fire behavior within the Project Area than if the treatments occurred. Nearby private land and homes would also be at greater risk for high severity fire effects. Tactical opportunities for firefighting resources would be reduced and resultant fire size may increase.

Cumulative Effects

Fire suppression activities would continue on Federal and non-Federal lands. The BLM has a master cooperative fire protection agreement with the Oregon Department of Forestry (ODF). This agreement gives the ODF responsibility for fire protection on all lands within the Project Area. The agreement directs the ODF to take immediate action to control and suppress all fires. Their primary objective is to minimize total acres burned while providing for firefighter safety. The agreement requires the ODF to control 94 percent of all fires before they exceed 10 acres.

Defensible space and driveway treatments would likely continue by private land owners, but the actual acreage of the treatments is unknown. More accurate mapping of private land treatment areas is underway by Jackson County and the Oregon Department of Forestry. As a result of ongoing programs to implement defensible space around structures, driveways, and roads for potential escape or evacuation routes, the risk of structure and human loss during wildfire events would continue to decrease.

3.3.2.2 Effects of Alternative 2 (Proposed Action) on Fire and Fuels

Direct and Indirect Effects

Under Alternative 2, the BLM would thin conifer stands from below, cutting and piling conifer trees up to 8 inches diameter. Overstory canopy closure would be retained. Treatment of the noncommercial-sized material in the proposed treatment units would reduce surface and ladder fuels. The proposed fuels reduction treatments would reduce fire behavior such as flame length, rate of spread, and fire duration. With the reduction of flame length and fire duration, the chance of a crown fire initiating in these stands would be reduced. The reduction in fire behavior would lessen the potential damage from a wildfire initiated within or adjacent to the Project Area and would increase tactical opportunities for firefighters to limit fire spread and damage to residential homes during a wildfire.

The proposed action could increase fire resiliency of vegetation within the Project Area. A forest that is fire-resilient has characteristics that allow it to readily recover from a fire event. A forest's resiliency to fire can be increased by managing surface fuels to limit the flame length, removing ladder fuels to keep flames from burning into tree crowns where trees have no defense against fire, and retaining larger diameter trees that are more fire resistant (Agee and Skinner 2005; Agee 1996; Agee 1993).

The Oregon Forestland-Urban Interface Fire Protection Act, often referred to as Senate Bill 360, enlists the aid of property owners toward the goal of turning fire-vulnerable urban and suburban properties into less-volatile zones where firefighters may more safely and effectively defend homes from wildfires. Basically, the law requires property owners in identified forestland-urban interface areas to reduce excess vegetation, which may fuel a fire, around structures and along driveways. In some cases, it is also necessary to create fuel breaks along property lines and roadsides.

The proposed action could slow and potentially reverse the departure from the historic fire regime within the Project Area. Within treatment areas, the condition class would shift from condition class 2 and 3 towards condition class 1. This trend will not be reversed instantly and could take several treatment entries to achieve condition class 1. Periodic maintenance treatment via prescribed fire or thinning by hand would be necessary to maintain the desired condition class in treated areas.

Cumulative Effects

This proposed action will compliment the fuel hazard reduction efforts of the Oregon Department of Forestry, Seven Basins Watershed Council, private landowners, and local communities working within their Community Wildfire Protection Plans (CWPP). Non-federal entities are treating between 100 to 200 acres per year within the Butte Falls Resource Area boundary.

The proposed action would, in many cases, "meet at the fence" with work being completed on private lands. The Oregon Forestland-Urban Interface Fire Protection Act has motivated many private landowners to complete fuel hazard reduction work and become certified. Certification relieves a property owner from the act's fire cost-recovery liability. The proposed action would enhance the goals of the Act and allow BLM to be a responsible neighbor.

The combined fuel hazard reduction effort on public and private lands would not make entire watersheds "fire proof." Large wildfires would likely still occur. However, the cumulative effect of all the fuel treatment units would help make entire neighborhoods and hillsides more fire resilient and increase the number of tactical fire suppression opportunities. Wildfires in treated areas should burn with less intensity and would allow more suppression options (i.e., direct versus indirect attack). Wildfires could be extinguished more easily and the number of burned acres would be reduced. Treated areas that

experience wildfire would burn with less severity and the environmental impacts on resources such as vegetation, soils, and air would be reduced.

3.4 Air Quality

3.4.1 Definitions

The following definitions apply to terms used in the Air Quality section:

Biomass: The vegetative material leftover from stand treatments.

Convection: Atmospheric motions that are predominantly vertical in the absence of wind, resulting in vertical transport and mixing of atmospheric properties.

Fuel Loading: Amount of live and dead woody fuels available to burn on a given site. Emissions are measured in tons per acre.

Inversion: A layer of warm air that prevents the upward movement of air and traps pollutants beneath it; can cause an air pollution episode.

Maintenance areas: Geographic areas that had a history of nonattainment, but are now consistently meeting the National Ambient Air Quality Standard (NAAQS). Maintenance areas have been redesignated by the U.S. Environmental Protection Agency (EPA) from "nonattainment" to "attainment with a maintenance plan," or designated by the Environmental Quality Commission.

Mop up: Extinguishing or removing burning material near control lines, felling snags, and trenching logs to prevent rolling after an area has burned, to make a fire safe or to reduce residual smoke.

Nonattainment area: A geographic area that violates the National Ambient Air Quality Standards.

Particulate Matter (PM): A fine particulate air pollutant that consists of solid particles or liquid droplets less than 10 microns in diameter (PM10) or less than 2.5 microns in diameter (PM 2.5).

Prescribed fire: A fire burning under specified conditions that will accomplish certain planned objectives. Includes handpile burning, underburning, and broadcast burning.

3.4.2 Affected Environment

The Oregon Department of Environmental Quality (DEQ) is a regulatory agency whose job is to protect and enhance the air quality. The Oregon DEQ monitors air pollutant levels through a network of monitoring and sampling equipment sites throughout Oregon. Particulate matter (PM) is an important indicator of air quality and PM10 and PM2.5 have been identified as the particulate sizes of concern because they can be inhaled deeply into the lungs and remain for years. Oregon DEQ monitors PM levels at two sites in Medford, one in White City, one in Shady Cove, and one in Grants Pass.

Medford and Grants Pass are the closest designated air quality maintenance areas to the proposed Project Area. Grants Pass was redesignated as a maintenance area in 2003 for PM10 and Medford in 2006 for PM10.

The Medford District BLM is required to be in compliance with the Oregon Smoke Management Plan (OAR 629-048-0010). The Oregon Smoke Management Plan designates areas as Smoke Sensitive Receptor Areas (SSRA), which are areas designated for the highest level of protection under the smoke management plan, as described and listed in OAR 629-048-0140. The closest SSRAs to the Project Area are the Grants Pass Urban Growth Boundary and the Bear Creek and Rogue River Valleys, as described in OAR 629-048-0160. The objective of the Smoke Management Plan is to prevent smoke from prescribed burns from entering SSRAs.

Prior to conducting prescribed burning activities, the BLM must register prescribed burn locations with Oregon Department of Forestry. The specific location, size of the burn, fuel loadings, ignition source, time, and duration of ignition are reported prior to ignition. Smoke management advisories or restrictions are generated on a daily basis by the State Meteorologist. This information is used to determine the appropriate time to conduct the planned prescribed burn. Most prescribed burning on the Medford District is accomplished by hand pile burning. The burning of hand piles generally occurs during the winter months during storm events when unstable atmospheric conditions are present in order to maximize mixing and lessen smoke impacts to localized areas. In addition, all piles are covered then burned when all other fuels are damp. This allows the rapid consumption of target fuels, prevents "nontarget" fuels from burning, and minimizes the amount of residual smoke produced.

Communities within the Project Area would likely experience times of reduced air quality during the winter months from wood burning stoves. Smoke from woodstoves and fireplaces can contribute to air pollution in the fall and winter, especially during temperature inversions and periods of air stagnation. Existing sources of emissions include occasional construction and logging equipment, light industrial vehicles, road dust, residential wood burning, campfires, and prescribed fire.

3.4.3 Environmental Consequences

3.4.3.1 Effects of Alternative 1 (No Action) on Air Quality

Under Alternative 1, no prescribed burning treatments or forest management activities proposed under this EA would occur. The potential for future wildfire and the impacts of smoke from a large wildfire event would continue as the degree of departure from the historic fire regimes continues.

Direct and Indirect Impacts

Impacts to air quality from wildfires are closely related to the amount of biomass material consumed (surface and ladder fuel loads) and atmospheric conditions. Wildfires generally occur during the hot, dry summer months when atmospheric conditions are stable and fuels are readily available to burn. A high intensity wildfire with heavy fuel loading could cause a high level of emissions.

Particulate matter (PM) produced from wildfires limits visibility and can exacerbate health problems. A portion of air borne particulate matter can be less than 2.5 microns in size. These small particles can be most harmful to individuals because they have the ability to penetrate deep into the lungs. If a wildfire were to occur, the emissions could present health concerns to those individuals living downwind and

in nearby low lying areas. Symptoms from short-term smoke exposure can range from scratchy throat, cough, irritated sinuses, headaches, and stinging eyes. Persons with asthma, emphysema, congestive heart disease, and other existing medical conditions can have more serious reactions. The elderly and children are also high-risk groups (Oregon DEQ 2009).

Cumulative Effects

No permanent sources of particulate matter production exist on BLM managed lands within the project and air quality and visibility is thought to be good. Activities such as residential wood burning, traffic exhaust, and road dust on private and public lands throughout the Project Area may have localized impacts of short duration. Smoke created from wood burning would continue as a source of air pollution and may affect those individuals with asthma, respiratory or heart conditions, or other illnesses, especially during inversions or times of stagnated air. Oregon DEQ has developed a statewide woodstove program to promote the use of cleaner burning woodstoves and to help home owners burn wood more efficiently and with less pollution.

Private home owners in the Project Area would continue to reduce hazardous fuels under the Oregon Forestland-Urban Interface Fire Protection Act. Burning on private timber lands within the watersheds containing the Project Area would continue under the guidelines of the Oregon Smoke Management Plan.

Impacts from a wildfire event would be dependent on the size, intensity, location, atmospheric conditions, and duration. Emissions from a small wildfire would be localized and short in duration and impacts would be within local drainages. The potential health hazards to individuals living in the vicinity or downwind from a large intense fire could be substantial. The duration and exposure to pollutant emissions would increase, impacting human health and public welfare. This would continue until the fire was out and atmospheric conditions allowed for sufficient dispersion of the smoke. Alternative 1 would have the greatest potential for large-scale smoke events from wildfires because the current surface fuel loading on BLM-administered lands would not be reduced.

3.4.3.2 Effects of Alternative 2 (Proposed Action) on Air Quality

Direct and Indirect Effects

Under Alternative 2, handpile burning, underburning, and broadcast burning would occur to reduce the surface fuel loading on identified BLM managed land.

Prescribed burning would affect air quality by the addition of carbon monoxide, PM10, and PM2.5. Photo Series would be used to determine the fuel loading for underburns and visual measurements would be used to determine fuel loading for pile burning. The project fuels specialist estimates that hand pile fuel loading would be less than 20 tons/acre. Underburning and broadcast burning fuel loading would vary but would be between 3 and 12 tons/acre. Of the 7,900 acres proposed for treatment, approximately 1,500 acres of hand pile burning and 1,000 acres of underburning would be completed each year. A large portion of particulate matter emissions produced during prescribed burning is “lifted” by convection into the atmosphere where it is dissipated by horizontal and downward

One of the most important tradeoffs to consider is the substantial increase in smoke production from wildfires versus prescribed fire. Wildfires occur when fuels are dry, fuel consumption is greater, and the fuels are consumed during the less efficient smoldering stage, which nets about twice as much PM10 when compared to prescribed fire. If prescribed fire can be used to restore or maintain fire-adapted ecosystems, yet reduce the potential of wildfire, PM10 production from landscape burning could be reduced considerably (Huff et al. 1995, p. 36).

dispersion. At distances greater than 5 miles, the air concentrations for these emissions are expected to be small. Under these conditions and by following the prescribed fire management guidelines in the Oregon Smoke Management Plan, there would be negligible direct or indirect effects on air quality within the Project Area.

Prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan and the Visibility Protection Plan (OAR 340-200-0040, Section 5.2). As a result, the BLM does not expect prescribed burning to affect visibility within the Crater Lake National Park and neighboring wilderness smoke sensitive Class I areas (Kalmiopsis and Rogue Wilderness Areas). In addition, prescribed burning emissions are not expected to adversely affect annual PM10 attainment within the Grants Pass and Medford/Ashland nonattainment areas.

Pollutant concentrations are reduced by atmospheric mixing, which depends on weather conditions such as temperature, wind speed, amount of sunlight, and the movement of high and low pressure systems and their interaction with the local topography, for example, mountains and valleys. Normally, temperature decreases with altitude. But when a colder layer of air settles under a warm layer, producing a temperature inversion, atmospheric mixing is impeded and pollutants may accumulate near the ground. Inversions can become sustained under a stationary weather system coupled with low wind speeds. The BLM would schedule hand pile burning primarily from October to May during unstable atmospheric conditions (e.g., rain, snow, or storm events) when atmospheric mixing is occurring. Wet season conditions minimize 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. All piles would be covered with 4 mil polyethylene plastic sheeting to facilitate rapid ignition and consumption of fuels to minimize residual smoke.

Use of Plastic Covering for Burn Piles

The Oregon Department of Forestry Smoke Management Plan addresses the issue of using plastic to cover piles. OAR 629-048-0210(2), Best Burn Practices; Emission Reduction Techniques, states, ". . . best burn practices involve methods that ensure the most rapid and complete combustion of forest fuels . . . ." Covering of hand piles is a "Best Burn Practice." OAR 629-048-0210(4) states, "When covers will not be removed and thus will be burned along with the piled forest fuels, the covers must not consist of materials prohibited under OAR 340-264-0060(3), except that polyethylene sheeting that complies with the following may be used: a) Only polyethylene may be used. All other plastics are prohibited."

Air quality concerns have led to prohibitions on the open burning of plastics in many areas of the country. However, burning polyethylene with slash is allowed in some areas for two reasons: (1) Slash burning usually takes place far from populated areas and is done when smoke will not reach these areas so the general public is not exposed or concerned, and (2) air quality officials realize that using polyethylene to cover slash will result in lower emissions overall because less petroleum products are needed for ignition, and more complete and rapid burning can be achieved when slash is dry (USDA 1994).

An addendum to the original Wrobel and Reinhart literature review (2003) on the use of polyethylene sheeting to enhance combustion efficiency, discusses the rules affecting polyethylene (PE) burning. Oregon and New Mexico are the only western states that allow *in situ* burning of PE pile covers. Oregon has addressed the issue based on the findings reported by Wrobel and Reinhart (2003). The Oregon Department of Environmental Quality and the Oregon Department of Forestry developed an MOU for PE that was adopted in 2005. The MOU suggests the plastic material should be removed prior to burning when practicable. Adequate debris or slash is placed over the plastic sheeting to ensure the plastic remains covering the piles until the piles are burned. This ensures the most

rapid and complete combustion of slash debris. Due to the difficulty of removing the plastic cover from below the debris, especially after long-term exposure to the elements, it would be operationally and economically impractical to remove the plastic prior to burning for this proposed action. Therefore, the plastic would be left in place and burned along with the pile. As required, the BLM would use sheets of 4 mil polyethylene plastic no larger than 10 feet by 10 feet per pile to cover piles.

Alternative coverings, such as kraft paper, are used in other parts of the country to cover burn piles in place of PE. Combustion studies involving lignocellulosic materials suggest that uncoated kraft paper may produce some of the same substances as polyethylene (Garcia et al. 2003). The study also states that from an operational standpoint, kraft paper is a more expensive, less durable, and less effective means of minimizing moisture intrusion into the pile because of its tendency to degrade more rapidly than PE. In turn, fuel moisture is increased, combustion efficiency is reduced, and more accelerants may be needed for pile ignition.

Additionally, the weight and means of packaging kraft paper contributes to decreased production and increased per unit cost of covering piles. Kraft paper averages 55 pounds per square bundle compared to 12 pounds per roll for polyethylene use. It takes 3 bundles of Kraft paper (165 pounds) to cover the same amount of piles that one roll of PE (12 pounds) will cover. Kraft paper bundles are 4-foot by 4-foot square and are awkward to pack into a unit compared to a roll of polyethylene that can be easily packed into the unit. The size and shape of Kraft paper bundles combined with increased weight could also contribute to increased potential for worker injuries (e.g. knee, back, and ankle sprains) during operations.

Underburning would be scheduled from October to the end of May. Burning in the spring or after rain events reduces impacts to the soil, consumption of large woody materials and duff layer, and allows for rapid mop-up following ignition. Localized concentrations of smoke may occur in adjacent drainages and low lying areas during prescribed burning operations. Timing of all prescribed burning would be dependent on weather and wind conditions to help reduce the amount of residual smoke to the local communities. If residual smoke impacts exceed limits set by the Oregon Smoke Management Plan, additional burning would be suspended until given the notice to proceed by the ODF Forester.

Cumulative Effects

Short-term increase of particulates in the air, primarily from prescribed burning smoke, would be anticipated. Other activities such as road maintenance, vehicle emissions, and dust also contribute slightly to the localized temporary degradation of air quality in the Project Area.

The use of prescribed fire to reduce fuel hazard and loading could improve long-term forest productivity and, therefore, reduce the risks and consequences of a major wildfire. The temporary impacts of smoke from prescribed fire would have minor effects on the use of forest resources, such as recreation sites and scenic resources. Long-term benefits of using prescribed fire to reduce hazardous fuels would outweigh the short-term effects on air quality.

3.5 Soil

3.5.1 Definitions

Metamorphic rocks: Rocks which have undergone a change in texture or composition as the result of heat and pressure. This typically results in a more competent mineralogy than the original rocks.

Montmorillonitic Clays: Montmorillonite is a very soft phyllosilicate group of minerals that typically form in a microscopic crystal, forming clay particles. These clays are very reactive and bond with both adhesive and cohesive properties. Soils with this clay mineralogy have a high shrink-swell potential, are easily compacted, and are prone to slumping.

3.5.2 Methodology

- Past field reconnaissance by the Butte Falls Resource Area Soil Scientist and the Josephine and Jackson County Soil Surveys (USDA 1993) were used to identify and describe the soil series.
- GIS was used to compute soil acreages by treatment unit and by percent of the total treatment acres.
- Medford District ROD/RMP was used to identify recommended management practices for soils with a fragile designation.

3.5.3 Assumptions

- All project design features will be appropriately implemented to meet resource objectives.

3.5.4 Affected Environment

Due to the widespread distribution of the proposed fuel treatment units across the Butte Falls Resource Area (BFRA) landscape, many different soil types can be found within the Project Area. Table C-1 in Appendix C, Soil displays each proposed treatment unit along with the corresponding soil type and acreage. Table 3-3 displays percent soil type by total treatment acres.

Table 3-3. Soil Types in the Butte Falls Hazardous Fuels Units

Name	Acres	Percent of Total
Abegg soils	40	<1
Beekman-Colestine soil complexes	1,337	18
Caris-Offenbacher soil complexes	545	7
Carney soils (pyroclastic clays)	95	1
Goolaway soils (schists)	76	1
Josephine-Pollard soil complexes	102	1
Josephine-Speaker soil complexes	1,172	16
Langellian-Brader soil complex	208	3
Manita soils	125	2
McMullin-Medco soil complexes	266	4

Table 3-3. Soil Types in the Butte Falls Hazardous Fuels Units

Name	Acres	Percent of Total
McMullin-Rock Outcropping soil complex	486	6
McNull soils	390	5
McNull-McMullin soil complexes	327	4
McNull-Medco soil complexes	119	2
Medco soils (pyroclastics clays)	384	5
Medco-McMullin soil complexes (pyroclastics clays)	335	4
Ruch soils	43	<1
Shefflien soils (granitics)	435	6
Siskiyou soils (granitics)	150	2
Tallowbox soils (granitics)	103	1
Vannoy soils	768	10
Wolfpeak soils (granitics)	55	1
Project Total	7,561	100

In general, most of the soil types (75 percent) have formed in relatively stable parent materials such as volcanic (e.g., andesite, rhyolite, welded tuffs, and breccias) rocks and metamorphosed volcanic and sedimentary rocks. These soil types typically have low to moderate erosion and runoff potential and are found on relatively stable landforms. The most abundant of these soil types are the Caris, Offenbacher, Vannoy, Beekman, Colestine, Josephine, Speaker, and McMullin. The 1995 Medford District ROD/RMP does not recommend special mitigation for these soil types.

Approximately 11 percent of treatment units have soils that formed in decomposed granitic and schistic parent materials which typically have moderate to high erosion and mass movement potential. Low amounts of soil fines and organic material in the surface layer of these soils makes them susceptible to detachment and downslope movement after disturbance. The decomposed and highly fractured parent materials underlying these soils also tend to make them subject to debris slides. The most abundant of these soil types were classified in the 1995 Medford District ROD/RMP as being fragile due to mineralogy which recommends more restrictive mitigation (see ROD/RMP, p.155-157).

Approximately 14 percent of treatment units have soils formed in highly weathered volcanic rocks (tuffs and breccias) which typically have high clay content (greater than 35 percent) in the subsoil. The highly reactive montmorillonitic clays in these soil types tend to make them highly susceptible to compaction and slumping. The most abundant of these soil types in the Project Area are the Medco, Carney, and McNull. The 1995 Medford District ROD/RMP classifies these soils as fragile and recommends more restrictive mitigation (see ROD/RMP, p.155-157).

3.5.5 Environmental Consequences

3.5.5.1 Effects of Alternative 1 (No Action) on Soil

Direct and Indirect Effects

No fuels treatments are proposed under the No Action Alternative, so there would be no direct effect on the soil resource from project activities. However, without the proposed fuels treatments much of the

Project Area will remain at a high to moderate risk for wild fire due to the existing high fuel hazards. High intensity wildfire and wildfire suppression activities (i.e., tractor firelines and drop zones) can directly lead to exposed or burned over soil areas that are susceptible erosion and losses in soil productivity.

Cumulative Effects

Past activities and natural events that have impacted the soil resource across the Project Area include timber harvest, grazing, recreation, private land development, road development, and wildfire. This has led to an increase in the potential for soil erosion and soil productivity losses in all watersheds containing the Project Area. The scale and intensity of these activities vary from watershed to watershed due to differences in management practices based on land ownership and differences in soil type, topography, and climate.

Under the No Action Alternative, high wildfire hazard would continue in the Project Area. Wildfire can expose soils to indiscriminate increases in erosion and productivity losses, especially in areas with high intensity uncontrolled fire. These effects could last for the long-term (more than 5 years) and, depending on the size of the wildfire, they could be detectable at the fifth field watershed scale or larger.

3.5.5.2 Effects of Alternative 2 (Proposed Action) on Soil

Direct and Indirect Effects

Under Alternative 2, the BLM proposes to treat approximately 7,900 acres for fuel hazard reduction. Manual slashing (cutting), hand pile burning, and underburning (7,000 acres), and broadcast burning (900 acres) are proposed to reduce fuel loadings within the Project Area.

Soil productivity loss due to the consumption of the duff layer, is the most common adverse effect on the soil resource from pile burning. Even though burn piles are typically ignited during the wet winter season, the duff layer and the soil surface directly under the piles can be exposed to high intensity heat which can consume the duff layer and, in some cases, alter the mineral faction of the soil surface layer. The loss in soil productivity resulting from severely burned soil could last for the long-term (more than 5 years) depending on size of the pile, soil type, vegetative type, slope configuration, aspect, and climate. The factors that moderate this effect are the small size of the piles and the wide distribution over the landscape. This allows for more biological interaction between the small islands of burned soil and the surrounding matrix of undisturbed areas. This helps to promote and accelerate recovery in soil productivity when compared to one large burn area of the same size.

Soil erosion is also a concern for soils exposed to high intensity heat under the burn piles. The potential for erosion on bare soils under burn piles depends on the steepness of slope, soil type, and the amount and type of surrounding vegetation. Water repellency in the soil surface from severely burned soil can also contribute to an increase in run-off and erosion. In most cases and under normal southern Oregon rainfall scenarios, the surrounding undisturbed soil and vegetation of the piles is expected to reduce the movement of soil off-site by slowing down and dispersing run-off before it can become erosive. Another moderating factor is that operationally 10 percent of slash piles are left unburned which most often are located in riparian reserves, steeper sideslopes, and special plant buffers. These factors are expected to minimize or eliminate soil erosion from outside of the burn piles and keep erosion effects localized to inside the pile area until the burned area recovers.

Broadcast burning and, to a lesser extent, underburning can also reduce soil productivity and increase soil erosion. Long duration fires burning with high or moderate intensity can volatilize or alter soil nutrients such as nitrogen, phosphorous, and sulfur. The loss or alteration of these nutrients can hinder vegetative recovery and leave the soil vulnerable to erosion for longer periods. Depending on site characteristics (i.e., plant community, soil type, slope configuration, and climate), these effects could last for the long-term (more than 5 years).

The following factors would moderate the effects of broadcast burning and underburning in order to stay within the recommended guidelines for light to moderate burns in the 1995 ROD/RMP (p.169):

- Low elevation shrubs and grasses contain relatively small diameter fuels (3 to 6 inches) which equates to shorter fire durations.
- Relatively flat linear topography (0 to 35 percent slopes) means flames are farther from the soil surface than on steep slopes.
- Broadcast burning would occur in the winter or spring, when the soil and duff layer moisture content is typically elevated.
- Strip-head firing[1] and backfiring lighting techniques can reduce fire intensities by burning out areas with higher fuel loadings prior ignition or by strip ignition patterns.
- No broadcast burning would occur on Category 1(highly sensitive) soils (1995 ROD/RMP, p.168)

Cumulative Effects

Burn piles typically average 50 piles per acre with the average pile size being approximately 6 feet by 6 feet (36 square feet). This equals approximately 4 percent of the total of all burn pile unit acres. Therefore, approximately 4 percent of the 7,000 acres, or 279 acres, proposed for hand pile burning would have some measurable amount of soil productivity loss under the burn piles. Due to the wide distribution and small size of the burn piles relative to the total amount of acres in all fifth field watersheds (Table 3-4), the BLM expects cumulative effects on soil erosion at the fifth field watershed scale would be undetectable.

Table 3-4. Acres of Soil Productivity Loss from Hand Pile Burning relative to Proposed Hand Pile Burning and Fifth Field Watersheds

5th Field Watersheds	Watershed Acres	BLM Acres	Proposed Fuel Treatment Acres	Burn Pile Acres
Evans Creek	143,275	59,199	4,575	183
Gold Hill/Rogue River	135,950	33,060	1,520	61
Shady Cove/Rogue River	74,215	22,424	870	35
Total	353,440	114,683	6,965	279

[1]Strip-head firing is an ignition pattern used to burn out strips of fuels from the top to the bottom of the slope to reduce fire intensity.

3.6 Water Resources

3.6.1 Methodology

The project hydrologist used the following sources for analysis:

- The *Lower Evans Creek, Mid Evans Creek, West Fork of Evans Creek,* and *East Evans Creek* watershed analyses (USDI 1995; USDI 1995; USDI 1995; USDI 1996) provided general water resources background information for the Project Area.
- Geographic Information System and BLM Field Visits were used to analyze the existing condition of the Project Area.
- Stream types on BLM-administered lands were identified through site visits; non-Federal land stream types were estimated using aerial photo interpretation and information on adjacent BLM-administered lands.
- The scale for analysis for Water Resources is the three fifth field watersheds containing the Project Area.

3.6.2 Assumptions

- Short-term effects are 10 years or less; long-term effects last more than 10 years.
- Hand piles would be an average of 6 feet by 6 feet in size with approximately 50 piles per acre.
- Burning hand piles would burn an average of 4 percent of the area proposed for hand pile burning.

3.6.3 Affected Environment

3.6.3.1 Introduction

The Butte Falls Hazardous Fuels Reduction project lies within three fifth field watersheds: Evans Creek, Gold Hill/Rogue River, and Shady Cove/Rogue River (Table 3-5). About 60 percent of the Gold Hill/Rogue River fifth field watershed is within the Butte Falls Resource Area; the remaining 40 percent is in the Ashland and Grants Pass Resource Areas. The area of the watershed within the Butte Falls Resource Area is the area analyzed in this EA. The other two fifth field watersheds are entirely within the Butte Falls Resource Area.

Table 3-5. Watersheds containing Fuels Hazard Reduction Projects

Fourth Field Subbasins	Fifth Field Watersheds	Sixth Field Subwatersheds
Middle Rogue	Evans Creek	Upper West Fork Evans Creek Lower West Fork Evans Creek Upper Evans Creek Middle Evans Creek Pleasant Creek Lower Evans Creek
	Gold Hill/Rogue River	Snider Creek Sams Creek-Rogue River Sardine Creek Ward Creek Galls Creek Whetstone Creek-Rogue River
Upper Rogue	Shady Cove/Rogue River	Brush Creek Indian Creek-Rogue River Snider Creek

The average annual precipitation varies substantially depending on location and elevation; precipitation ranges from 20 inches to 40 inches per year. Most precipitation occurs during the fall, winter, and early spring months. Low stream flows normally prevail from July through September or October, the period of low precipitation. Moderate to high flows exist during the remainder of the year. High flows begin about mid-November and can last through April. During the months of May and June, stream flows are increased by melting snowpack. Historically, extreme high flows have been the result of rain-on-snow events during the warmer months of winter.

Rain predominates in the lower elevations (generally less than 3,500 feet) with the majority occurring in late fall, winter, and early spring. A mixture of rain and snow occurs between approximately 3,500 and 5,000 feet; this area is referred to as either the rain-on-snow zone or transient snow zone (TSZ). The snow level in this zone fluctuates throughout the winter in the watersheds in response to alternating warm and cold fronts. The snow-dominated precipitation zone lies above 5,000 feet. No hazardous fuel treatment areas are located within the TSZ or snow-dominated precipitation zones.

Surface water in the proposed Butte Falls Hazardous Fuels Reduction Project Area includes streams, irrigation ditches, springs, wetlands, and reservoirs. The main waterbodies are Evans Creek and the Rogue River. The BLM classified streams in the planning area as perennial, intermittent with seasonal flow (long duration intermittent), intermittent with ephemeral flow (short duration intermittent), and dry draws with ephemeral flow (Table 3-6). Stream types on BLM-managed lands were identified through site visits; USFS and non-Federal land stream types were estimated using aerial photo interpretation and extrapolation from information on adjacent BLM-managed lands.

Table 3-6. Miles of Stream by Type and Fifth Field Watershed

Stream Type	Fifth Field Watershed			
	Shady Cove/ Rogue River	Evans Creek	Gold Hill/ Rogue River	Total
Dry Draw	72	700	546	**1,318**
Short Duration Intermittent	234	782	512	**1,528**
Long Duration Intermittent	204	313	260	**777**
Perennial	96	330	213	**639**
Total	**606**	**2,125**	**1,531**	**4,262**

Streams categorized as perennial or intermittent on Federal lands are required to have riparian reserves as defined in the Northwest Forest Plan (USDA and USDI 1994). Dry draws do not meet requirements for streams needing riparian reserves because they lack the combination of a defined channel and annual scour and deposition (USDI 1995, p. 27). Streams on industrial forest lands are managed according to the Oregon Forest Practices Act, which classifies and protects streams based on three beneficial use categories (fish use, domestic water use without fish use, and all other streams).

The Butte Falls Hazardous Fuels Reduction project proposes to treat overstocked, low elevation, upland vegetation. This project also includes treatment of up to about 4,000 acres of riparian reserves adjacent to proposed fuels units. These riparian reserves generally have similar high levels of understory vegetation densities and are at-risk for high burn severities if a wildfire occurred. No-treatment buffers in riparian reserves proposed for fuels reduction would protect riparian vegetation, water quality, and stream channels. No-treatment buffers would result in only the outer portions of the riparian reserves on perennial and long duration streams receiving fuels reduction. The entire riparian reserve on short duration intermittent streams would be thinned but no slash would be piled or burned within the channel bottom.

3.6.3.2 Water Quality

Water quality is the measure of the suitability of water for a particular use based on the chemical, physical, and biological characteristics of the water. To determine water quality, characteristics of the water, such as temperature, dissolved mineral content, and number of bacteria, are measured and analyzed. Selected characteristics are then compared to numeric standards and guidelines to decide if the water is suitable for a particular use.

303(d) Listed Streams

Oregon's Department of Environmental Quality (DEQ) is the state agency responsible for protecting Oregon's surface waters and groundwaters. The DEQ develops water quality standards for Oregon's waters and publishes them in Oregon Administrative Rules (OAR) 304-041. The DEQ is required by the Federal Clean Water Act to maintain a list of stream segments that do not meet water quality standards. This list is called the 303(d) list because of the section of the Clean Water Act that makes the requirement. The U.S. Environmental Protection Agency approved the DEQ's 2004/2006 303(d) list on February 26, 2007. This is the most recent 303(d) list.

Waterbodies can be listed for a variety of reasons. The most common reasons for listing a stream are stream temperature, dissolved oxygen, and *Escherichia coli (E. coli)* bacteria. Streams and rivers are usually not placed on the 303(d) list until sufficient data are available that indicate water quality standards have not been met.

Within the Project Area, 12 streams in the Evans Creek, Gold Hill/Rogue River, and Shady Cove/Rogue River fifth field watersheds are included on the 303(d) list for exceeding one or more of the following water quality criteria: dissolved oxygen, fecal coliform, bacteria (*E. coli*), and temperature (Table 3-7).

Table 3-7. Streams on the ODEQ 2004/2006 303(d) List in the Project Area by Fifth Field Watershed

Stream Segment	Listed Parameter	Season	Applicable Oregon Administrative Rule (at time of listing)	Total Miles Affected
Evans Creek Fifth Field Watershed				
Battle Creek	Temperature	Summer	340-041-0365(2)(b)(A)	3.9
Cold Creek	Temperature	Summer	340-041-0365(2)(b)(A)	4.2
East Fork Evans Creek	Temperature	Year-round (nonspawning season)	340-041-0028(4)(b)	17.7
Evans Creek	Fecal Coliform	Fall/winter/spring	340-041-0365(2)(e, f)	19.1
Evans Creek	Fecal Coliform	Summer	340-041-0365(2)(e, f)	19.1
Pleasant Creek	Temperature	Year-round (nonspawning season)	340-041-0028(4)(b)	12.0
Ramsey Canyon	Temperature	Summer	340-041-0365(2)(b)(A)	3.1
Rock Creek	Temperature	Summer	340-041-0365(2)(b)(A)	6.5
Salt Creek	Temperature	Summer	340-041-0365(2)(b)(A)	6.2
West Fork Evans Creek	Temperature	Summer	340-041-0365(2)(b)(A)	17.1
Total Stream Miles listed for Fecal Coliform Criteria (Fall/winter/spring)				**19.1**
Total Stream Miles listed for Fecal Coliform Criteria (Summer)				**19.1**
Total Stream Miles listed for Temperature Criteria (Summer)				**41.0**
Total Stream Miles listed for Temperature Criteria (Year-round [nonspawning season])				**29.7**
Gold Hill/Rogue River Fifth Field Watershed				
Birdseye Creek	Temperature	Summer	340-041-0365(2)(b)(A)	1.4
Galls Creek	Temperature	Summer	340-041-0365(2)(b)(A)	4.5
Total Stream Miles listed for Temperature Criteria (Summer)				**5.9**
Shady Cove/Rogue River Fifth Field Watershed				
Reese Creek	Dissolved Oxygen	Summer	340-041-0016(1)(a)(c)(2)	3.0
Reese Creek	*E. coli*	Summer	340-041-0009(1)(a)(A,B)	3.0
Indian Creek	Dissolved Oxygen	Summer	340-041-0016(1)(a)(c)(2)	5.2
Total Stream Miles listed for Dissolved Oxygen Criteria (Summer)				**8.2**
Total Stream Miles listed for *E. coli* Criteria (Summer)				**3.0**

Waters placed on the 303(d) list require the preparation of Total Maximum Daily Loads (TMDLs), a key tool in the work to clean polluted waters. TMDLs identify the maximum amount of a pollutant allowed to be released into a waterbody so as not to impair uses of the water. That amount is allocated among various sources.

In December 2008, the Oregon DEQ issued the Rogue River Basin TMDL as an executive order. The TMDL addresses temperature and bacteria (*E. coli*) impairments for an area that includes the Project Area. TMDLs are numerical loadings that are set to limit pollutant levels such that instream water quality standards are met. The BLM is recognized by Oregon DEQ as a Designated Management Agency for implementing the Clean Water Act on BLM-administered lands in Oregon. Each Designated Management Agency has 18 months from the time the Rogue River Basin TMDL became an executive order to develop or submit to Oregon DEQ an implementation plan. The BLM and Oregon DEQ have a Memorandum of Agreement (MOA) that defines the process by which the BLM will cooperatively meet State and Federal water quality rules and regulations. In accordance with the MOA, the BLM will develop or revise existing Water Quality Restoration Plans (WQRPs) as described in the MOA; the WQRPs will be the TMDL implementation plans for BLM (ODEQ and USDI 2003). The BLM submitted a final WQRP for BLM-administered lands in the Evans Creek Watershed in July 2009. WQRPs for the Gold Hill/Rogue River and Shady Cove/Rogue River are to be completed by July 2010. Recovery goals focus on protecting areas where water quality standards are being met and avoiding future impairments of these areas, and restoring areas that do not currently meet water quality standards.

3.6.4 Environmental Consequences

3.6.4.1 Effects of Alternative 1 (No Action) on Water Resources

Direct and Indirect Effects

Under the No Action Alternative, there would be no hazardous fuels reduction work completed on overstocked, low elevation, upland vegetation. These lands would remain at risk for high burn severities if a high intensity wildfire were to occur. High burn severities result in complete removal of duff and damage to soils which would increase the risk of erosion and subsequent stream sedimentation. A high intensity wildfire could remove streamside vegetation resulting in an increase to stream temperatures. Also, a large, high intensity wildfire could increase peakflows, baseflows, and water yields through the removal of large areas of vegetation.

Cumulative Effects

Historic human activities and natural events that have affected riparian areas across the Project Area include timber harvest, grazing, recreation, water diversion, private land development, road development, and wildfire. The spatial distribution of these activities varies from large (i.e., timber harvest, grazing, road development, and wildfire) to small (water diversion and recreation).

The cumulative effects of a wildfire occurring on these untreated acres could be great. A high intensity wildfire occurring on these overstocked stands would result in large areas of soil experiencing severe burn intensities. Severe and even moderate soil burn intensities can result in erosion and subsequent stream sedimentation. Large, intense wildfires could also result in increases to stream temperature by removing streamside vegetation. Peakflows, baseflows, and water yields all have the potential to be affected by a large intense wildfire. These effects could cause reductions in water quality and alter stream channel geometry downstream in the watershed, potentially having long-term effects.

3.6.4.2 Effects of Alternative 2 on Water Resources

Direct and Indirect Effects

Under Alternative 2, approximately 7,900 acres are proposed for hazardous fuels reduction across the Project Area. To minimize ground disturbance, all proposed fuel treatments would be completed by hand. No new roads would be constructed so there would be no ground disturbance from road building. Existing access would be used to accomplish the hazardous fuels reduction treatments. Upland treatments are not expected to impact water quality based on the type of treatments and distance from stream channels.

Of the total acres treated, approximately 4,000 acres of riparian reserves would be treated. Treatments include hand piling slash, burning hand piles, underburning, and broadcast burning. Burning hand piles would result in a 6-foot by 6-foot burned area with vegetation and an unburned ring of woody material remaining around the burnt area that would minimize soil movement. Underburns would be conducted when soil and duff are moist to minimize the potential for large areas of bare soil and reducing the potential of sediment movement. Broadcast burning would be short duration, low to moderate intensity burns which would minimize the potential for bare soils across a large area and reduce the potential for sediment transport.

A 60-foot no-treatment buffer on perennial and fish-bearing streams and a 35 -foot no-treatment buffer on long duration intermittent streams would be implemented, reducing the total amount of treated acres. Short duration intermittent streams would have treatments occur with limitations (see Table 2-1). The no-treatment buffers would allow fuels reduction on the outside edge of the riparian reserve where upland conditions exist while maintaining the true riparian vegetation in the buffers. No-treatment buffers would minimize the potential for stream sedimentation after hand pile burning, underburning, or broadcast burning, when soil is exposed and has the potential for movement. PDFs to restrict treatments outside of a streams inner gorge and keep hand piles outside of channels would minimize the potential for stream sedimentation.

Overstory vegetation would remain untreated as part of the hazardous fuels reduction project so canopy closure would remain unaffected. There would be no effect to stream temperature because canopy closure would be maintained. Maintenance of the riparian vegetation in the 60-foot no-treatment buffers along perennial streams would retain stream shade and, therefore, maintain stream temperatures. Changes to water quantity would not occur because canopy closure would remain unchanged.

The Project Area contains 3 streams on the 303(d) list with a total of 2.0 miles flowing through or near proposed fuels units (Table 3-8). Water quality on these listed streams would remain unaffected by the proposed fuels treatments because overstory vegetation would be maintained and a 60-foot no-treatment buffer would maintain stream shade and protect stream temperatures. Low levels of dissolved oxygen are caused by high stream temperatures and lack of turbulence during summer low flows. Maintaining stream shade would act to maintain water quality in Indian Creek which is listed for dissolved oxygen. Hazardous fuel reduction units are not located near streams listed for *E. coli*. *E. coli* is produced in warm-blooded vertebrate animals and is not caused by forest management activities.

Table 3-8. Miles of 303(d) Listed Streams in or near Proposed Fuels Units

Fifth Field Watershed	Stream Name	Listed Parameter	Miles
Evans Creek	East Fork Evans Creek	Temperature	0.3
	Ramsey Canyon	Temperature	0.3
Shady Cove/Rogue River	Indian Creek	Dissolved Oxygen	1.4
		Total Miles	**2.0**

The majority (77 percent) of the stream miles proposed for treatment would occur in the Evans Creek fifth field watershed (Table 3-9). Of those stream miles proposed for treatment, 79 percent of the streams are short-duration intermittent streams, which only flow in response to storm events, and dry draws which would only flow water in extreme rare events. In general, these streams have overstocked upland-type vegetation and are at risk for high intensity wildfires. The total stream mileage proposed for treatment (107.8 miles) is very low compared to the total mileage of streams in the three watersheds (4,261.8 miles).

Table 3-9. Miles of Streams in Proposed Fuels Units by Stream Type

5th Field Watershed	Treatment	Stream Type (miles)				Totals
		Perennial	Long Duration	Short Duration	Dry Draw	
Evans Creek	Thin and Prune/Hand Pile/ Hand Pile Burn/Underburn	3.4	13.9	48.6	17.0	**82.9**
Gold Hill/ Rogue River	Thin and Prune /Hand Pile/ Hand Pile Burn/Underburn	0.8	2.0	3.1	1.1	**7.0**
Shady Cove/ Rogue River	Thin and Prune /Hand Pile/ Hand Pile Burn/Underburn	0.8	3.1	6.9	1.2	**12.0**
	Thin and Prune /Hand Pile/ Hand Pile Burn/Underburn/ Broadcast Burn	2.5	1.7	1.4	0.3	**5.9**
Totals		**7.5**	**20.7**	**60.0**	**19.6**	**107.8**

Cumulative Effects

Historic human activities and natural events that have affected riparian areas across the Project Area include timber harvest, grazing, recreation, water diversion, private land development, road development wildfire, and windstorms. The spatial distribution of these activities varies from large (i.e., timber harvest, grazing, road development, and wildfire) to small (water diversion and recreation).

Hazardous fuels treatments would be spread across the landscape of three fifth field watersheds and treatments would be completed over a 5-year time period. Distributing hazardous fuels treatments over time and throughout the three fifth field watersheds would minimize cumulative effects by allowing vegetation to recover in one area while treatment occurs in another.

Although a high intensity wildfire could still occur on the treated acres given the right conditions, the likelihood is reduced in these areas. Also, if a wildfire did occur, the burn severity on these acres would be reduced which would minimize the impacts to water resources.

The effects of Alternative 2 on riparian reserves and related water quality on a landscape scale – when combined with past, ongoing, and reasonably foreseeable activities – would be negligible and difficult to distinguish from other activities in the watershed, especially when compared to other impacts to water quality such as wildfire and past road, skid trail, and landing construction.

3.7 Fisheries

3.7.1 Definitions

Anadromous: Species that live their adult lives in the ocean but move into freshwater streams to reproduce or spawn.

Critical Coho Habitat (CCH): On May 5, 1999, the National Marine Fisheries Service (NMFS) designated CCH for Southern Oregon/Northern California (SO/NC) coho salmon. CCH includes "all waterways, substrate, and adjacent riparian zones below longstanding, naturally impassable barriers." It further includes "those physical or biological features essential to the conservation of the species and which may require special management considerations or protection . . . ," including all historically accessible waters (64 FR 86:24049).

Essential Fish Habitat (EFH): Essential Fish Habitat is defined by NMFS as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." This definition includes all waters historically used by anadromous salmonids of commercial value (including coho salmon).

Evolutionarily Significant Unit (ESU): A population or group of populations of salmon that 1) is substantially reproductively isolated from other populations and 2) contributes substantially to the evolutionary legacy of the biological species.

Fry: Young salmonid that is free swimming and feeding.

3.7.2 Methodology

- Information used in this analysis includes GIS, Aquatic Habitat Inventories (ODFW 1997, 1999, 2000), BLM Field Observations, *Seven Basins Watershed Assessment*, *Upper Rogue Watershed Assessment,* and *Evans Creek Watershed Analyses*. Literature related to fisheries, streams, hydrology, road activities and wildfires was also used for the analysis of this project.
- The Fisheries analysis area is composed of the Evans Creek and Gold Hill-Rogue River fifth field watersheds located in the Middle Rogue River fourth field subbasin and the Shady Cove-Rogue River fifth field watershed located in the Upper Rogue River fourth field subbasin. The Foots Creek sixth field, within the Gold Hill/Rogue River fifth field watershed, is entirely out of the Butte Falls Resource Area on the opposite side of the Rogue River than all other watersheds. The treatments proposed in this project are not expected to have impacts that would affect fisheries at the fifth field watershed scale. Therefore, the Foots Creek sixth field does not require additional analysis and will not be included in this EA.

3.7.3 Assumptions

- Fish are dynamic, adaptive, and move throughout the stream systems (Bramblett et al. 2002, Kahler, Roni, and Quinn 2001, Hilderbrand and Kershner 2000) to avoid short-term increases in sediment levels (Kahler, Roni, and Quinn 2001).
- Riparian reserves can be thinned from activities such as hazardous fuels reduction without changing stream temperatures by maintaining shade levels (USDA and USDI 2004).
- Thinning young and overstocked riparian forests can more rapidly achieve larger diameter trees (Berg and Maki 2003).

3.7.4 Affected Environment

3.7.4.1 Introduction

The Project Area is contained within three fifth field watersheds; Evans Creek, Gold Hill/Rogue River, and Shady Cove/Rogue River. The Evans Creek and Shady Cove/Rogue River fifth fields are entirely within the Butte Falls Resource Area. The Gold Hill/Rogue River fifth field watershed has 60 percent of its total area within the Butte Falls Resource Area and 40 percent within the Ashland Resource Area and Grants Pass Resource Areas, all within the Medford District.

Land ownership in the three fifth field watersheds is 67 percent private, 32 percent BLM, and 1 percent other landowners (US Army Corps of Engineers, US Forest Service, and State of Oregon).

Within the Project Area, hazardous fuels reduction is proposed in approximately 4,000 acres of riparian reserves. About 170 acres of fuels reduction are proposed in CCH and about 112 acres of fuel reduction would occur in non-CCH fish habitat (Table 3-10).

Table 3-10. Acres of Fuel Reduction Units in Riparian Areas by Fifth Field Watershed

Fifth Field Watershed	Treatment	Acres of Fuel Units in Riparian Areas				
		Fish-bearing Streams			Non-Fish-bearing	Total
		CCH	Non-CCH	Total		
Evans Creek	Thin and Prune/Hand Pile/ Hand Pile Burn/Underburn	49	46	95	2,965	**3,060**
Gold Hill/ Rogue River	Thin and Prune/Hand Pile/ Hand Pile Burn/Underburn	5	29	34	198	**232**
Shady Cove/ Rogue River	Thin and Prune/Hand Pile/ Hand Pile Burn/Underburn	33	37	70	383	**453**
	Thin and Prune /Hand Pile/ Hand Pile Burn/Underburn/ Broadcast Burn	83	0	83	165	**248**
Total		**170**	**112**	**282**	**3,711**	**3,993**

The Evans Creek fifth field watershed is part of the Middle Rogue fourth field subbasin and is made up of six sixth field watersheds. The Gold Hill/ Rogue River fifth field watershed is part of the Middle Rogue River fourth field subbasin and consists of seven sixth field watersheds. The Shady Cove/Rogue River fifth field watershed is part of the Upper Rogue fourth field subbasin and consists of three sixth field watersheds (see Table 3-5).

3.7.4.2 Fish Populations

Major fish species found in the three fifth field watersheds that contain the Project Area include coho salmon (*Oncorhynchus kisutch*), steelhead trout (*O. mykiss*), cutthroat trout (*O. clarki*), and Chinook salmon (*O. tshawytscha*). Chinook salmon are only found in the Rogue River and low in the main stem of Evans Creek. Cutthroat trout have the widest distribution, followed by steelhead, and then coho salmon (Table 3-11).

Table 3-11. Miles of Fish Habitat by Fifth Field Watershed

Fifth Field Watershed	Miles	Species
Evans Creek	107	coho salmon/steelhead trout
	168	cutthroat trout
	20	Chinook salmon
Gold Hill-Rogue River*	55	coho salmon/steelhead trout
	63	cutthroat trout
	28	Chinook salmon
Shady Cove-Rogue River	46	coho salmon/steelhead trout
	61	cutthroat trout
	30	Chinook salmon

*Fish habitat information does not include the Foots Creek sixth field or streams on the south side of the Rogue River.

There is a total of 168 miles of fish habitat in the Evans Creek fifth field watershed, 63 miles in the Gold Hill/Rogue River fifth field watershed, and 61 miles in the Shady Cove/Rogue River fifth field watershed.

Fish populations are influenced by natural and human-caused disturbances. Factors such as habitat loss or degradation, commercial fishing, and variable ocean conditions are primarily responsible for the depressed status of most fish species (Nehlsen et al. 1991). Primary issues for fish in the Project Area include road-related sediment and lack of large woody debris (USDI 1995).

Coho Critical Habitat

NOAA's National Marine Fisheries Service (NMFS) listed the Southern Oregon Northern California (SO/NC) Coho Salmon Evolutionarily Significant Unit (ESU) as "threatened" under the Endangered Species Act (ESA) in May 1997. As directed under ESA, NOAA Fisheries designated SO/NC coho salmon critical habitat (CCH) and Essential Fish Habitat (EFH), which are defined as areas within the geographical area currently or historically occupied by the species that have the physical or biological features essential to the conservation of the species and requires special management and protection. The Evans Creek fifth field watershed contains a total of 107 miles of CCH in 29 streams, Gold Hill/Rogue River fifth field watershed contains a total of 55 miles of CCH in 6 streams, and Shady Cove fifth field watershed contains a total of 46 miles of CCH in 6 streams (Table 3-12).

Table 3-12. CCH Streams in the Fifth Field Watersheds containing the Project Area

Fifth Field Watershed	Stream	
Evans Creek (107 miles CCH)	West Fork Evans Creek Cedar Creek Slick Rock Sand Creek Rock Creek Cold Creek Battle Creek East Fork Evans Creek Chapman Creek Canon Creek Morrison Creek Mystery Creek Evans Creek Taylor Gulch McConnville Gulch	Sykes Creek May Creek Maple Gulch Ramsey Canyon Pleasant Creek Right Fork Pleasant Creek Fry Gulch Ditch Creek Queens Branch Brown Gulch Bear Branch Trimble Creek Maple Creek Fielder Creek
Gold Hill/Rogue River* (55 miles CCH)	Snider Creek Rock Creek Sams Creek	Rogue River Sardine Creek Ward Creek
Shady Cove/Rogue River (46 miles CCH)	Rogue River Lewis Creek Brush Creek	Long Branch Creek Indian Creek Reese Creek
*NOTE: Only the CCH streams located north the Rogue River are included.		

3.7.4.3 Population Trends

Limited information is available on the current fish populations in the three fifth field watersheds that make up the analysis area. The coho salmon numbers over Gold Ray Dam reflect the overall population trends for the Middle and Upper Rogue River fourth field subbasins and ESU, including the Fisheries analysis area. The coho salmon population for the Rogue River basin has been monitored by Oregon Department of Fish and Wildlife (ODFW) at Gold Ray Dam since 1942. The wild adult coho salmon population was extremely low from 1965 to 1979 when numbers were as low as 12 returning adults (Satterthwaite 2002). Populations were on an upward trend since 1979; however, since 2002, the wild adult population has been dropping. The 2007 returns are among the lowest of the last 10 years (ODFW 2009a) and the coho population remains low throughout their range (Figure 6).

The Oregon Native Fish Status Report (ODFW 2005) assessed production and abundance of coho salmon, spring and fall Chinook salmon, and winter and summer steelhead within the Upper Rogue River fourth field watershed. All species met ODFW production, abundance and distribution goals, indicating short-term (5 to 10 years) sustainability for these species is not at risk. The only goal that was not met was reproductive independence of spring Chinook due to the large number of hatchery fish in the Rogue River Basin (Table 3-13).

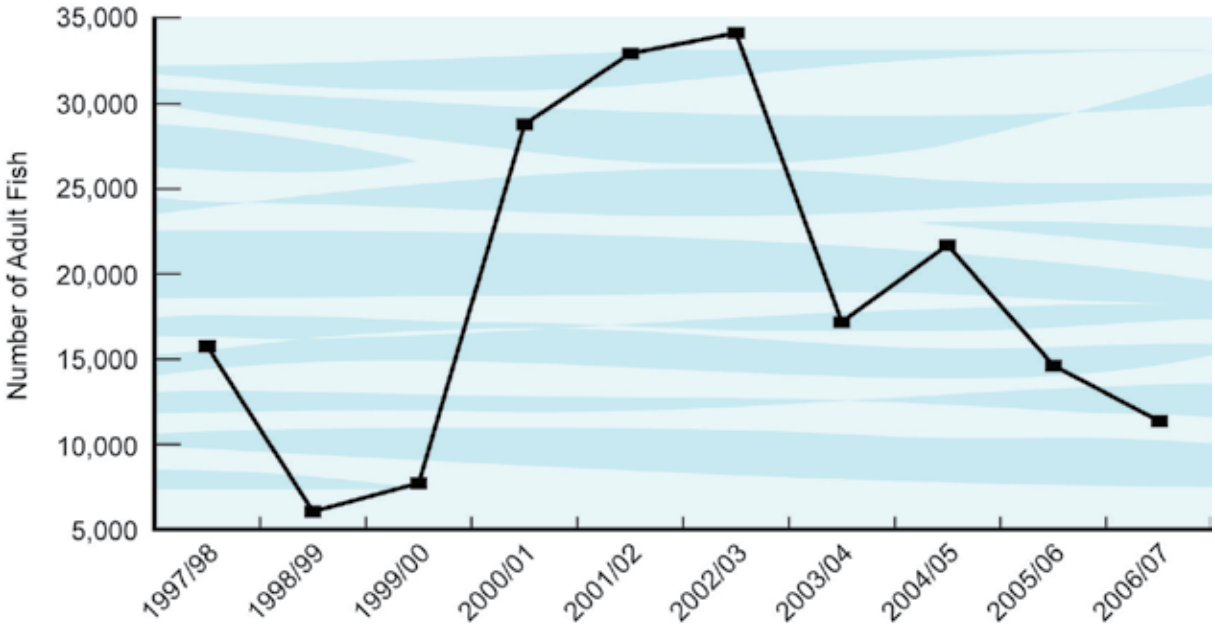

Figure 6. Number of coho salmon returning to the upper Rogue River from 1997 to 2007 (ODFW 2009).

Table 3-13. Status of Upper Rogue River Anadromous Fish Populations based on ODFW's Native Fish Assessment Criteria

Species	ESA Listed?	Existing	Distribution	Abundance	Productivity	Reproductive Independence
Coho	Threatened	Pass	Pass	Pass	Pass	Pass
Spring Chinook	No	Pass	Pass	Pass	Pass	Fail
Fall Chinook	No	Pass	Pass	Pass	Pass	Pass
Winter Steelhead	No	Pass	Pass	Pass	Pass	Pass
Summer Steelhead	No	Pass	Pass	Pass	Pass	Pass

Historical information on local fish populations is unknown. Fish numbers were likely higher before private development, timber harvest, and roads were constructed in the area. The current distribution of coho and steelhead is likely less than historical because of irrigation dams and culverts blocking fish passage.

3.7.4.4 Aquatic Habitat

Salmon and trout species need cool water temperatures, hiding cover, clean spawning gravels, rearing pools, an adequate supply of food, and unimpaired passage for good fish production.
Large wood in the streams provides cover for fish and traps fine sediment.

Temperature

Water temperature is one of the most important variables controlling habitat suitability for salmonids. Optimum temperatures for coho, steelhead, and cutthroat trout are 55 to 60 degrees Fahrenheit (°F) and temperatures over 84°F are considered lethal (Meehan 1991).

Under the Clean Water Act requirements, Oregon DEQ rules have set the 7-day average maximum summer temperature limit as 64.4 °F. Within the Evans Creek fifth field watershed Oregon DEQ has

eight streams on the 303(d) list for temperature. These streams are Battle Creek, Cold Creek, East Fork Evans Creek, Pleasant Creek, Ramsey Canyon, Rock Creek, Salt Creek and West Fork Evans Creek. These streams all contain fish habitat and all, except Salt Creek, contain CCH.

Within the Gold Hill/Rogue River fifth field watershed, Oregon DEQ has two streams on the 303(d) list for temperature: Birdseye Creek and Galls Creek. Both streams contain CCH.

Within the Shady Cove/Rogue River fifth field watershed, no streams are on the 303(d) list for temperature. See Water Resources, section 3.6.3.2, Water Quality, for more information on water quality.

Sediment

Clean gravel is important for spawning fish (Meehan 1991). When high, fine sediment levels occur in spawning gravels, less spawning occurs, eggs tend to be suffocated, and emerging fry become trapped, resulting in reduced production (Phillips et al. 1975; Tappel and Bjornn 1983; Chapman 1988; Meehan 1991).

Pools provide important rearing habitat for juvenile salmon and trout (Nickelson et al. 1992; Rosenfeld, Porter, and Parkinson. 2000) and winter holding habitat for adult fish (Cunjak 1996). Streams with high levels of fine sediments tend to have shallow pools because sediment deposits fill in these areas (Meehan 1991).

The road density for the three fifth field watersheds is as follows: Evans Creek 5.45 miles per square mile, Gold Hill/Rogue River 5.13 miles per square mile, and Shady Cove/Rogue River 4.89 miles per square mile. A study conducted in the Clearwater River Basin in the Olympic Peninsula looked at road densities and their influence on stream sediment levels. They found densities above 4 miles per square mile to be responsible for 2.6 to 4.3 times the natural rate of sediment production to streams (Reid, Cederholm, and Salo 1981). Based on the literature and the amount of roads in the Fisheries analysis area, it is reasonable to assume that the high sediment levels in the analysis area are largely due to roads.

Large Woody Debris (LWD)

LWD is important for providing cover for fish, forming pools, stabilizing channels, and trapping and sorting fine sediment (Meehan 1991). LWD also provides channel roughness to dissipate stream energy which causes bank erosion and increases channel widths (Montgomery and Buffington 1997). Reductions in LWD, through past wood removal and timber harvest in riparian areas, have led to channel simplification and reduced cover for fish.

Aquatic Habitat Surveys

There is little data available on aquatic habitat; however, ODFW and BLM conducted Aquatic Habitat Inventories in 1997, 1999, and 2000. Streams in the Evans Creek fifth field were surveyed in 2000. Streams within the Gold Hill/Rogue River fifth field were surveyed in 1997. In the Shady Cove/Rogue River fifth field, Indian Creek was surveyed in 1999 and Lewis Creek in 1997 (ODFW 1997, 1999, 2000). Aquatic habitat for the streams surveyed is considered to be representative of the condition of all streams within the corresponding fifth field watersheds.

Habitat benchmarks considered were percentage of fine sediments and gravel in riffles, pieces of LWD per 100 meters, pool area as a percentage of total stream area, conifers greater than 20 inches DBH per 1000 feet, and residual pool depth. Residual pool depth is the difference in depth or bed elevation between a pool and the downstream riffle crest. Residual dimensions represent extreme low flow conditions, which often determine the capacity of streams to produce fish (Lisle 1987).

Table 3-14 summarizes the findings of the habitat surveys. In Table 3-14, no shading indicates the parameter is meeting the desirable criteria, the lightest shading indicates the parameter is in between desirable and undesirable conditions, and the darkest shading indicates the parameter is in undesirable condition.

Table 3-14. ODFW Aquatic Inventory and Analysis Project 1997-2000

Stream Name	Habitat Benchmarks					
	% Fines in Riffles	% Gravel in Riffles	LWD pieces/ 100 meters	Pool Area (% Stream Area)	Residual Pool Depth (Slope >3%)	Conifers >20" DBH/ 1000 feet
Gold Hill/Rogue River Fifth Field Watershed						
Left Fork Sardine Creek	17	40.5	7.5	13.5	0.4	6
Middle Fork Sardine Creek	17	29	9	17	0.3	30
Right Fork Sardine Creek	27.7	27	8.7	19.3	0.47	17.3
Tributary Right Fork Sardine Creek	23	19	15	21	0.5	30
Shady Cove-Rogue River Fifth Field Watershed						
Lewis Creek	5	36.5	4.3	13.7	No Data	6.7
Indian Creek	13.5	22	4.5	17.2	0.4	12
Evans Creek Fifth Field Watershed						
Pleasant Creek	19.3	36.7	8.7	22.8	0.8	11
Queens Branch	18	28	3.8	22.2	0.6	24
North Fork Queens Branch	26	28	8.2	10	0.5	15
Jamison Gulch	36	37	15.7	11	0.4	81
Ditch Creek	18	32	6.1	16.6	0.4	61
Tributary Rock Creek	25	31	18.1	29.4	0.4	0
Morrison Creek	11	20	14.5	18.9	0.4	20
Habitat Benchmark Condition Parameters						
Desirable	**<10**	**≥35**	**>20**	**>35**	**>1.0**	**>300**
Undesirable	**>20**	**<15**	**<10**	**<10**	**<0.5**	**<150**

No Shading = Desirable Condition
Light Gray = Between Desirable and Undesirable Condition
Dark Gray = Undesirable Condition

3.7.4.5 Riparian Habitat

Riparian areas are important for fish and the aquatic ecosystem. Riparian vegetation provides LWD for streams and cover for fish. Streamside vegetation provides bank stability, maintains undercut banks, and provides habitat for insects, an important food source for fish. Riparian vegetation provides a protective canopy layer that helps maintain cool water temperatures (Meehan 1991; Beschta et al. 1987) on perennial streams during summer months. When riparian vegetation is removed, stream temperatures often increase (Johnson and Jones 2000), LWD levels decline, and fish production can decline (Hartman et al. 1987). Sun exposure is the largest cause of increasing temperatures. Other factors, such as climate, stream size, elevation, and groundwater flows, also influence stream temperature (Beschta et al. 1987).

Fire frequencies in riparian areas associated with perennial streams are found to be lower than in adjacent uplands, due to higher humidity (Skinner 1997). However, riparian reserves along perennial streams will burn if climate conditions are extremely dry (Gresswell 1999). Riparian areas along intermittent streams, where microclimate conditions at the stream are often similar to drier conditions in the uplands, can have fire frequencies similar to upland areas (Skinner 1997).

3.7.4.6 Fish Passage/Barriers

Fish access to all available habitat is important for fish production and restoring fish passage is an effective way to increase the availability of habitat (Roni et al. 2002). It is common for fish to move within streams and between stream systems throughout the year (Kahler, Roni, and Quinn 2001).

The Evans Creek fifth field watershed has nine dams on five streams; four of the streams contain fish habitat – Evans Creek, May Creek, Ditch Creek, and Queens Branch Creek. Three dams are passable or marginally passable by fish. An unnamed dam on Queens Branch Creek does not have a fish ladder and is impassable by fish (ODFW 2009b).

Gold Hill/Rogue River fifth field watershed has seven dams located on streams with fish habitat –Sams Creek, Snider Creek, Sardine Creek, Rogue River, and Foots Creek. Of these dams, six are marginally or seasonally passable (ODFW 2009b). The seventh, Gold Ray Dam, passable to fish, on the Rogue River is being studied for removal and may be removed by the end of 2010.

Shady Cove/Rogue River fifth field has one dam located on the Rogue River. The Table Rock Diversion Dam is described as a push up dam that is not always in place (ODFW 2009b).

3.7.4.7 Aquatic and Riparian Habitat Trends

Timber harvest has decreased over the years in all three fifth field watersheds on both private and BLM-administered lands, resulting in reduced erosion and stream sediment levels. Most culverts allow fish passage and have been upgraded to handle 100-year flood events, resulting in less risk of major washouts and providing fish access to most available habitat. However, until road density is reduced, stream sediment levels will remain high. Riparian areas are improving throughout the Project Area. As a result, the younger stands are recovering and will provide an increase in shade levels and a supply of LWD.

3.7.5 Environmental Consequences

3.7.5.1 Effects Common to Both Alternatives

Cumulative Effects

Future Federal actions in the Project Area would include timber sales in the Evans Creek fifth field watershed, silviculture treatments, improved road maintenance and drainage, renewal of current cattle grazing leases, and restoration of disturbed areas. Future Federal timber management could include riparian thinning in riparian reserves adjacent to thinned timber stands to maximize conifer growth rates and reduce stand susceptibility to insects by increasing stand and tree vigor (Dwire and Kauffman 2003). Riparian thinning improves LWD potential, enhances shade, and continues to allow the riparian areas to recover from previous timber management activities.

Future Federal actions will implement project design features and best management practices to minimize impacts and improve riparian and aquatic function. Therefore, future aquatic conditions on Federal lands will have higher LWD levels, reduced fine sediment levels, more complex pools, and increased stream canopy cover resulting in increased fish productivity.

On private or industrial forest lands, timber production would occur on a 60-year harvest rotation. Riparian areas would continue to be managed according to the Oregon Forest Practices Act. Due to the checkerboard pattern of private and federally administered land in the Project Area riparian and aquatic habitat will continue to be fragmented across the landscape.

3.7.5.2 Effects of Alternative 1 (No Action) on Fisheries

Direct and Indirect Effects

Under the No Action Alternative, hazardous fuels would not be treated. Aquatic and riparian habitats would continue at the current rate of recovery and would be subject to past and ongoing disturbances. Evans Creek, Gold Hill/Rogue River and Shady Cove/Rogue River fifth field watersheds would remain at an elevated risk for intense wildfire. Though fire is a natural component of these environments, high fuel loadings could potentially cause a fire to have greater impacts than it would have had historically. Without hazardous fuels reductions, small drainages would be more likely to experience severe wildfires. Wildfires could potentially have negative impacts to aquatic and riparian habitat. Anticipated direct effects from severe wildfire would be the removal of riparian vegetation resulting in the indirect effects of increased peak flows, increased sediment transport, and elevated water temperatures. Combined effects of these impacts would degrade aquatic and riparian habitat, leading to decreased fish productivity.

3.7.5.3 Effects of Alternative 2 (Proposed Action) on Fisheries

Direct and Indirect Effects

Alternative 2 would have no direct effects on Fisheries due to the implementation of project design features and best management practices including no-treatment buffers on perennial and long duration streams channels, only small diameter trees being cut, ensuring 50 percent canopy cover is retained in treated riparian reserves, and no treatment of fuels in inner gorges greater than 35 percent slope.

Literature regarding the effects of prescribed fire in riparian areas is limited and many articles call for research projects to help quantify effects, both positive and negative. However, the mechanisms

by which wildfire could influence fish habitat have been described. The primary concerns include the potential to increase water temperature, the potential loss of LWD, and the potential to increase sediment as riparian vegetation is removed.

Implementation of project design features and best management practices, including no-treatment buffers on perennial and long duration streams, only cutting trees less than 8 inches in diameter, and leaving more than 50 percent canopy cover post-treatment, would ensure this project would have no effect on water temperatures. Within the Project Area, the vast majority of shade to stream channels is provided by large conifers, large hardwoods, or riparian hardwoods (field observations); these trees would not be treated.

Hazardous fuels reduction would have no negative effect on LWD because, large diameter trees would not be treated or adversely affected by burning and a no-treatment buffer would be in place on perennial and long duration stream channels. Treating small diameter vegetation would increase the potential for long-term LWD inputs and increase shade as less competition may increase tree vigor, allowing trees to obtain mature or old growth characteristics quicker (Dwire and Kauffman 2003).

The potential for increased sediment transport to stream channels is extremely low. Project design features would require broadcast burns and underburns to leave approximately 10 percent of the area unburned as wildlife habitat. In addition, cool underburns implemented from October to May, as proposed in this project, typically burn in a mosaic pattern, leaving unburned patches in and amongst areas where vegetation would be consumed. This would be particularly true in riparian areas where humidity is generally much higher and temperatures cooler than in the surrounding uplands. Remaining unburned patches would provide buffers against soil movement off exposed sites. Due to no-treatment buffers immediately adjacent to perennial and long duration stream channels and the exclusion of fuels treatments from inner gorge slopes 35 percent or greater along all streams, the soil in untreated areas would remain undisturbed. Intact overstory and untreated riparian vegetation would remain to intercept rainfall and overland flow. The potential of increased sediment delivery to streams in the Project Area would be for less than one year. Regrowth of understory vegetation would occur by the spring following the underburns and broadcast burns, effectively creating a sediment barrier in the outer treated areas of riparian reserves.

Given the absence of direct effects, low potential of sediment delivery, no effect on water temperature, and improved long-term LWD potential, implementation of this project would have “No Affect” on fish production, CCH, or fisheries resources in the Evans Creek, Gold Hill/Rogue River or Shady Cove/ Rogue River fifth field watersheds.

3.8 Botanical Resources

3.8.1 Definitions

Calcareous Rock: Rock mostly or partly composed of calcium carbonate in the form of calcite or aragonite, in other words, containing lime or being chalky.

Hyphae: One of the filaments of a mycelium; the basic structure of a fungus.

Mycelia (mycelium): A mass of hyphae; the non-reproductive structure of a fungus.

Mycorrhiza(e) (mycorrhizal): A mutually beneficial symbiotic association of plant roots and fungi.

Seral Stages: The series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage. The five seral stages are Early Seral (0-10 years); Mid-Seral (10-40 years); Late Seral (40-80 years); Mature Seral (80-200 years); and Old Growth (200+ years) (USDI BLM 1995, p. 112-113).

3.8.2 Methodology

3.8.2.1 Botanical Surveys

The Medford District ROD/RMP gives management direction to conduct field surveys for Special Status plant species prior to management activities to determine if species are present or if habitat would be affected (USDI 1995, p. 51). Consultation for T&E plants (USDI FWS 2008; USDI BLM 2008) also requires surveys in suitable habitat within fuels reduction units. Three Federal Endangered species have ranges in the Butte Falls Resource Area: *Lomatium cookii, Limnanthes floccosa* ssp. *grandiflora*, and *Fritillaria gentneri*. None of the fuels reduction units are within the range of *Lomatium cookii*. Although some fuels units are located within the range of *Limnanthes floccosa* ssp. *grandiflora*, they contain no suitable habitat or designated critical habitat. The Jackson County populations of these two Federal Endangered plants occur in vernal pool habitat. All of the proposed fuels units, except the Pleasant Refry project, are within the range of the Federal Endangered plant *Fritillaria gentneri* and some contain suitable habitat.

Botanical surveys for Special Status vascular plants and noxious weeds have been completed on all but 82 acres of the proposed fuels reduction units. Surveys for Special Status nonvascular plants have been completed in the fuels units on all but 1,525 acres. The remaining acres will be surveyed for nonvascular species by mid-September 2009. The 82 acres will be surveyed for vascular plants in spring/summer 2010. In areas containing suitable *Fritillaria gentneri* habitat, a second survey will be conducted during the appropriate season in 2011 to meet Project Design Criteria in the programmatic consultation for T&E plants. A separate decision record for those 82 acres will be signed after surveys are completed.

The BLM does not require predisturbance surveys for Special Status fungi (USDI BLM 2004, Attachment 5, p. 1-2) because they fruit irregularly or are difficult to identify. Landscape-level strategic surveys and sampling were developed as a substitute for preproject surveys to gather information about the distribution and extent of rare fungi.

3.8.2.2 Analysis Area

The effects of fuels reduction on Special Status plants is analyzed in this EA for sites occurring within the proposed units. The BLM project botanist considers the effects of the proposed fuels reduction actions on Special Status plants occurring on BLM-administered lands only, but takes into consideration the location and number of populations outside the units when assessing the cumulative effects on the species across their ranges. The BLM does not conduct surveys on private lands and the presence of Special Status plants on private lands is not known or considered in this EA.

The analysis area for noxious weeds includes the proposed fuels units and adjacent areas known to contain noxious weed populations which provide a weed source that could invade the treated units.

3.8.3 Assumptions

- Although suitable habitat exists on private lands and rare plants may occur there, because they do not receive legal protection, we assume private lands do not contribute suitable habitat or protection for them.
- Short-term effects occur within the first 5 years of an event. Long-term effects occur more than 5 years after an event.

3.8.4 Summary

- The proposed fuels reduction activities in the Proposed Action "may affect, but would not likely adversely affect" the Federal Endangered plant *Fritillaria gentneri* because surveys in suitable habitat have been or will be completed before implementation and sites would be protected with buffers or seasonal restrictions. Fuels reduction activities would be "no affect" to the two other Federal Endangered plants with ranges in the Butte Falls Resource Area – *Limnanthes floccosa* ssp. *grandiflora* and *Lomatium cookii* – because no sites occur in the Project Area.
- The proposed fuels reduction activities would not trend Sensitive vascular or nonvascular plants toward listing because surveys have been or will be completed prior to implementation and sites would be protected with buffers or seasonal restrictions.
- The BLM assumes that protecting known sites (current and future found), in addition to conducting large-scale inventories throughout the Pacific Northwest, will ensure that this project and future projects would not contribute to the need to list Sensitive fungi (USDI 2004, p. 5-2).
- The use of project design features and ongoing treatments of noxious weeds in the Butte Falls Resource Area would reduce the risk of introducing or spreading noxious weeds as a result of the proposed fuels reduction treatments.

3.8.5 Affected Environment

The proposed fuels reduction units are scattered across the Butte Falls Resource Area in both the Klamath Mountain and Cascade Mountain Ecoregions. Elevation ranges from 1,200 feet in the Gold Hill/Highway 234 fuels Project Area to 3,500 feet in the Fielder Mountain Project Area. Habitat types include conifer and mixed hardwood-conifer forests; Oregon white oak woodland and savanna; chaparral; and rocky, scabland meadow openings. According to GIS data, approximately 76 percent of the units are forested stands, 22 percent are oak woodland or chaparral stands, and 2 percent are

meadows. However, the actual amount of oak woodland, chaparral, and meadows is greater because there are many small inclusions of these habitats within conifer stands and their acres are not separated from the conifer stand acres in GIS. The diversity of plant communities in the units provides habitat for several of the Special Status plants that occur in the Medford District BLM.

3.8.5.1 Special Status Plants

Special Status plant categories include Federal Threatened and Endangered (T&E) and Bureau Sensitive vascular plants, lichens, bryophytes, and fungi. The BLM's policy for Special Status plants is to 1) conserve, protect, and manage T&E and Special Status plants and the ecosystems on which they depend; and 2) ensure that actions authorized on BLM-administered lands do not contribute to the need to list Bureau Special Status species under the provisions of the Endangered Species Act (USDI 1995, p. 50-53).

The BLM has documented 11 Special Status plant species with 50 sites in the hazardous fuels reduction units (Table 3-15).

Table 3-15. Special Status Plants in the Fuels Reduction Project Area

Scientific/ Common Names	Status	# Sites in Project Area	Ecological and Habitat Information (Project Area Site Location)
Arabis modesta Rogue Canyon rockcress	Sensitive	1	Perennial herb. Blooms in spring on rock walls and bluffs or damp, somewhat shaded banks or slopes above drainages; 500-1,500 feet. Range: In or near the Rogue River Canyon near Galice, Slagle Creek near Provolt, along Klamath River in Siskiyou County. The Butte Falls populations are a range extension. 22 sites in Medford District. (Old Ferry Road)
Carex serratodens Sawtooth sedge	Sensitive	1	Perennial sedge. Blooms in early summer. Grows in moist meadows and rocky places near streams and seepages below 6,000 feet. Range: Douglas, Jackson, and Josephine Counties, Oregon; Sierra Nevada and Coast Ranges of California. 60 sites in Medford District. (Southeast Shady Cove)

Table 3-15. Special Status Plants in the Fuels Reduction Project Area

Scientific/ Common Names	Status	# Sites in Project Area	Ecological and Habitat Information (Project Area Site Location)
Cypripedium fasciculatum Clustered lady-slipper orchid	Sensitive	15	Perennial orchid from rhizome. Blooms in spring in coniferous forest, generally on north-facing slopes at 1,000-3,000 feet. Range: Widely scattered in western states. Known only from southwest Oregon and from Baker County. Usually has only 2-7 plants per population, but occasionally populations contain 50+ plants. 1,175 sites in Medford District, although some populations are extant. (Southeast Shady Cove, Evans Creek East, Evans Creek, Pleasant Re-fry)
Fritillaria gentneri Gentner's fritillary	Federal Endangered	5	Perennial lily from bulb. Blooms in spring in oak woodland, chaparral, mixed hardwood-conifer woodlands; 1,000-5,000 feet. Often in ecotones between forested sites and more open habitats, often associated with shrubs. Range: Jackson and Josephine Counties, Oregon and one site in Siskiyou County, California just south of the Cascade-Siskiyou National Monument. 143 sites in Medford District, although some populations are likely extant. (Evans Creek East, Wedgewood Drive, Gold Hill/ Highway 234, Cardwell Creek)
Illiamna latibracteata California globe-mallow	Sensitive	1	Perennial shrub. Blooms in June and July in moist sites, along streamsides in coniferous forests. Often on shady, disturbed ground, 200-6,000 feet. Responds positively to fire. Range: Scattered sites throughout southwest Oregon in Coos, Curry, Douglas, Jackson, Josephine, and Linn Counties. Also south to Humboldt County, California. 28 sites Medford District. (Evans Creek)

Table 3-15. Special Status Plants in the Fuels Reduction Project Area

Scientific/ Common Names	Status	# Sites in Project Area	Ecological and Habitat Information (Project Area Site Location)
Limnanthes floccosa ssp. *bellingeriana* Bellinger's meadowfoam	Sensitive	1	Annual herb. Blooms in spring in full sun in vernally wet meadows or vernal pools, generally on basalt scablands at 1,000-4,000 feet. Sometimes on gopher mounds. Range: Jackson and Klamath Counties, Oregon; Shasta County, California. 107 sites Medford District. (Butte Falls Highway)
Nemacladus capillaris Slender nemacladus	Sensitive	1	Annual herb. Blooms in June or July. Grows on dry slopes and burned areas in oak woodlands or chaparral, 1,200-6,500 feet. Range: Jackson County, Oregon; more common in Coast Ranges, Sierra Nevada foothills, Great Basin, and desert province in California. 45 sites Medford District. (Butte Falls Highway)
Plagiobothrys austiniae Austin's popcorn flower	Sensitive	14	Annual herb. Blooms in spring in vernally wet meadows and along roads and trail edges, generally within oak woodlands or chaparral. Range: Jackson County, Oregon; east side of Central Valley from Shasta County to Stanislaus Mountains, California. 24 sites Medford District. (Butte Falls Highway)
Plagiobothrys greenei Greene's popcorn flower	Sensitive	7	Annual herb. Blooms in spring in vernally wet meadows and along trails and old roads within oak woodlands or chaparral. Range: Jackson and Josephine County, Oregon; California. 19 sites Medford District. (Butte Falls Highway, West Shady Cove)

Table 3-15. Special Status Plants in the Fuels Reduction Project Area

Scientific/ Common Names	Status	# Sites in Project Area	Ecological and Habitat Information (Project Area Site Location)
Porella bolanderi Bolander's scalemoss	Sensitive	2	Liverwort. Both populations in the fuels units are growing on large metamorphic rock outcrops on ridgelines in the Fielder Mountain area. The plant community is late seral mixed hardwood-conifer forest. Range: California, southern Oregon, Utah. 3 sites Medford District. (Fielder Creek)
Ranunculus austro-oreganus Southern Oregon buttercup	Sensitive	2	Perennial herb. Blooms in spring in oak woodlands and savannas, often around dripline of Oregon white oak trees. Range: Central Jackson County, Oregon. 66 sites Medford District. (Butte Falls Highway)

3.8.5.2 Sensitive Fungi

The Medford District BLM has documented 20 Sensitive fungi or suspects they are occurring. The BLM has not conducted fungi inventories in the Project Area and no populations of Sensitive fungi are known there. Of the 20 Sensitive fungi species, 8 have populations within 20 miles of the Project Area – *Gomphus kauffmanii, Phaeocollybia californica, Phaeocollybia olivacea, Ramaria largentii, Rhizopogon chamaleontinus, Rhizopogon ellipsosporus, Rhizopogon exiguous*, and *Sowerbyella rhenana*. All eight of these species occur in conifer or mixed hardwood-conifer stands, although they are not strictly associated with mature or old growth stands. Known populations for the 8 species range from 1 to 121. Suitable habitat is present in the fuels reduction units and Sensitive fungi sites could occur there; however, this is a low likelihood because the species are rare in the Pacific Northwest.

3.8.5.3 Unique Habitats and Plant Species

In addition to T&E and Bureau Sensitive plants, nine Bureau Strategic lichens and bryophytes have been also discovered in the Project Area and deserve mention due to their uniqueness and the uniqueness of their habitats. "Bureau Strategic Species" is a special status plant category established by the Oregon/ Washington BLM that includes plant and fungi species of concern in Oregon and Washington. These species do not warrant protection under the BLM Special Status Species policy (BLM 6840), but are species for which more information is needed to determine their rarity or are species that are locally rare or uncommon. Two additional species are mentioned that do not currently have status but are newly reported in the Oregon and may be assigned Special Status in the future (Table 3-16).

The discovery of some of the species in the fuels units are their first or second recorded sites in Oregon. The presence of so many uncommon and newly discovered species in a small geographic area indicates distinct and unique habitats. Overall lichen and bryophyte diversity was high in these units due varied topography, moisture regimes, and elevation.

Of the 11 uncommon or Bureau strategic species in the Project Area, 8 grow on rock outcrops, although rock type varies. Calcareous rock is an uncommon rock type in the Butte Falls Resource Area and calcium is regarded as a rare element in the region. Its presence accounts for some of the rare nonvascular species. Some of the rock outcrops are exposed and surrounded by meadows or open oak and mountain mahogany woodlands. Others are shaded by surrounding conifer forest. Several species are located on ridgelines, which are also unique habitats for uncommon lichens and bryophytes because they receive different light exposure than slopes and they capture moisture from fog. The Evans Creek Project Area contains 5 of the 11 species. They occur on seepy calcareous rock outcrops within 4 miles of each other; 5 species occur in 1 section.

Table 3-16. Strategic and Uncommon Plants in the Fuels Reduction Project Area

Scientific/ Common Names	Status	# Sites in Project Area	Ecological and Habitat Information (Project Area Site Location)
Collema undulatum var. *granulosum*	Strategic	1	Lichen. Population in Project Area is on vertical face of seepy calcareous rock wall in a 200-year-old conifer stand. Range: Jackson County in Oregon, British Columbia, Wyoming, Europe. 1 site in Oregon/Medford District. (Evans Creek)
Didymodon norrissii	Strategic	1	Bryophyte. Population in Project Area is on vertical face of seepy calcareous rock wall on steep slope in Oregon white oak woodland. Range: Jackson County in Oregon, California. 2 sites in Oregon/Medford District. (Evans Creek)
Leptogium plicatile	Strategic	2	Lichen. Both sites in Project Area are on seepy, calcareous rock outcrops on steep slopes surrounded by Oregon white oak and mountain mahogany. Range: Continental U.S., Europe, New Zealand. 3 sites in Oregon/Medford District. (Evans Creek)
Leptogium siskiyouensis	none	2	Lichen. Sites in Project Area are on canyon live oak in late seral and mixed hardwood-conifer forest stands. Range: Southwest Oregon. 6 sites Medford District. (Fielder Creek)

Table 3-16. Strategic and Uncommon Plants in the Fuels Reduction Project Area

Scientific/ Common Names	Status	# Sites in Project Area	Ecological and Habitat Information (Project Area Site Location)
Leptogium teretiusculum	Strategic	3	Lichen. Sites in Project Area are on California black oak in late seral mixed hardwood-conifer forest stands. Range: Douglas and Jackson Counties in Oregon, California, Idaho, British Columbia. 55 sites Medford District. (Evans Creek, Fielder Creek)
Orthotrichum bolanderi	Strategic	1	Bryophyte. Growing on metamorphic rock outcrop below ridgeline in mid- to late seral mixed hardwood-conifer stand. Range: Jackson County in Oregon, California, Washington, Mexico. 2 sites Medford District/Oregon. (Antioch Road)
Orthotrichum hallii	Strategic	2	Bryophyte. One site on calcareous rock outcrop in mixed hardwood-conifer stand; one on calcareous rock outcrop in Oregon white oak/mountain mahogany woodland. Range: Jackson County in Oregon, California, British Columbia, Idaho, Wyoming, New Mexico. (Evans Creek)
Oxystegus tenuirostris	Strategic	1	Bryophyte. Growing on small metamorphic rock outcrop in a shaded rock crevice in mature mixed hardwood-conifer forest. Range – Clatsop, Jackson, Lane Counties in Oregon, Montana, British Columbia (Evans Creek)
Tortella fragilis	Strategic	1	Bryophyte. Growing at base of seepy calcareous rock outcrop in mixed hardwood-conifer forest. Range: Jackson and Lincoln Counties in Oregon, Washington, Nevada, Montana, NE North America. 1 site Medford District (Evans Creek)
Trichostomum crispulum	none	1	Bryophyte. Growing in crevice of metamorphic rock outcrop in partially cut mixed hardwood-conifer forest. Range: Alabama, Vermont, Canada. 1 site in Oregon/Medford Distric/. (Fielder Creek)

Table 3-16. Strategic and Uncommon Plants in the Fuels Reduction Project Area

Scientific/ Common Names	Status	# Sites in Project Area	Ecological and Habitat Information (Project Area Site Location)
Umbillicaria hirsuta	Strategic	1	Lichen. Growing on sheltered face of house-size volcanic rock outcrop in opening of later seral mixed hardwood-conifer forest. Range: Jackson County in Oregon, California, Alaska, Montana, Colorado, Europe. 1 site Medford District. (Evans Creek)

3.8.5.4 Noxious Weeds

Noxious weeds are plants growing outside their native lands or habitats that are injurious to public health, agriculture, recreation, wildlife, or public or private property (ODA 2009, p. 3). The Oregon Department of Agriculture (ODA) designates and classifies noxious weeds according to their detrimental effects, reproductive strategies, distribution, and difficulty of control (Table 3-17).

Table 3-17. ODA Noxious Weed Control Rating System

Category	Criteria	Recommended Action
A	Weeds that occur in the State in small enough infestations to make eradication or containment possible, or are not known to occur, but their presence in neighboring states makes future occurrence in Oregon seem imminent.	Infestations subject to eradication or intensive control when and where found.
B	Regionally abundant weed, but which may have limited distribution in some counties.	Limited to intensive control at the state, county, or regional level as determined on a case-by-case basis. Where implementation of a fully integrated statewide management plan is not feasible, biological control (when available) shall be the main control approach.
T	A select group of A or B designated weeds.	Identified by the Oregon State Weed Board as a priority target on which the Oregon Department of Agriculture will develop and implement a statewide management plan

Source: Oregon Department of Agriculture, Plant Division, Noxious Weed Control Program. May 2008. http://www.oregon.gov/ODA/PLANT/WEEDS/docs/weed_policy.pdf

Weeds spread via seeds, which are carried from one location to another by air, water, animals, humans, or vehicles. Some weeds also spread when roots or other plant parts break off and resprout to create new plants. Newly disturbed areas are most vulnerable to noxious weed establishment because weed species have reproductive strategies that facilitate quick establishment and seed production. Roads are common avenues of invasion, as seeds lodge in tire treads and are carried from occupied areas into newly disturbed unoccupied areas. Table 3-18 lists activities that contribute to the establishment and spread of noxious weeds (USDI 1985, p. 59).

Table 3-18. Factors Affecting Noxious Weed Spread

Activity	Role in Dispersing Noxious Weed Seed
Private Lands	Private lands host a perpetual source for noxious weed seed, which can be dispersed when seeds attach to tires, feet, fur, feathers, or feces, or when natural processes such as wind and/or flooding events transport the seed from its source to another geographical vicinity.
Farming and Grazing	Farming creates soil disturbance and openings that noxious weeds can occupy. Farming equipment may move noxious weed seed from one area to another. Agricultural seed may be contaminated with noxious weed seed and spread during farming activities. Overgrazing of pastures or rangelands removes vegetation leaving bare, open spaces that noxious weeds could invade. If livestock are fed grain or hay containing noxious weed seed or parts, or consume noxious weeds, they may disperse them when they move to noninfested pastures or range.
Logging on Private Lands	Logging activity presents a key dispersal opportunity for noxious weed seeds. They may attach to tires or tracks of mechanized logging equipment, tires of log trucks, and various other logging-related substrates and be subsequently transported from their source to another geographic vicinity. Logging creates openings during ground disturbance and canopy removal which noxious weeds may colonize. Not using Project Design Features, such as equipment/vehicle washing, etc., also increases the risk of introducing or spreading noxious weed seed during logging operations.
Motor Vehicle Traffic (including Log Trucks)	Roads on public land are for public use, which results in a plethora of seed-dispersal activities occurring on a daily basis. Private landowners use public roads to haul logs, undertake recreational pursuits, and/or access their properties. This transportation often occurs along BLM-administered roads, which are situated within a checkerboard ownership arrangement. How or when seed detachment occurs is a random event and could take place within feet or miles from the work site/seed source, presenting a high likelihood of detachment on public lands.
Recreational Use	The public often recreates on BLM-managed lands and can spread seed from their residences or other areas to public lands in a variety of ways, including attachment to vehicle tires; recreational equipment; hikers' socks, shoes, or other clothing; fur of domestic animals, etc.
Rural and Urban Development	Because of BLM's checkerboard land ownership, BLM parcels are generally interspersed with private lands, many of which are used for homesites, businesses, or agricultural endeavors. Rural and Urban Development often involves ground disturbance during building or road construction which creates openings for noxious weeds to occupy. See "Motor Vehicle Traffic" and "Private Land" for additional information about how this affects the spread of noxious weeds from private to public lands.
Natural Processes	Wind, seasonal flooding, fire, and migration patterns of birds or animals are a few of the natural processes that contribute to the spread of noxious weeds. Wind, water, or wildlife carry seeds or other plant parts and deposit them at new locations at random intervals. Wildfire removes ground cover and leaves areas open to invasion by noxious weeds if a seed source is nearby.

The BLM documents and treats State of Oregon designated noxious weeds on BLM-managed lands in Oregon. They are detected during preproject botanical surveys or from incidental sightings. The BLM treats noxious weed populations on their lands under the *Medford District Integrated Weed Management Plan and Environmental Assessment* (OR-110-98-14) (1998). In the Medford District ROD/RMP, the objectives for noxious weeds are to continue to survey for, avoid introducing or spreading, and contain or reduce infestations on BLM-managed land (USDI 1995, p. 92-93). The BLM treats weeds by manual, mechanical, chemical, or biological means.

Noxious weed populations detected in the fuels reduction units during vascular plant surveys and from incidental sightings include five species (Table 3-19). Bull thistle (*Cirsium vulgare*) and Himalayan blackberry (*Rubus armeniacus*) are two additional noxious weeds occurring in the Project Area, although they have been reported irregularly. Both are category "B" species which the BLM does not treat because they are so widespread it would be impractical. Bull thistle grows in conifer stands where the canopy cover has been opened up, along roads and in waste areas. When the canopy cover returns, it shades out this species. Himalayan blackberry grows along riparian areas or in wet areas. It is widespread in the Rogue Valley and foothills of the surrounding mountains. Although it displaces native vegetation, it provides forage and shelter for birds and animals. The BLM treats these two species in specific situations when they are a threat to other resources; for example, if they were crowding out Sensitive plants or impacting a riparian area scheduled for restoration.

Table 3-19. Noxious Weeds Documented in or near Butte Falls Hazardous Fuels Reduction Units

Scientific/ Common Name	ODA Status	# Reported Sites	Ecological and Habitat Information (Project Area Site Location)
Tribulus terestris Puncturevine	B	1	Prostrate annual that forms mat with stems up to 4 feet long and spiny fruit capsules. Individual plants can produce over 1 million seeds. Tolerant of drought conditions. Grows along roadsides and in disturbed areas. (Butte Falls Highway, roadside only)
Chondrilla juncea Rush skeletonweed	B & T	3	Perennial plant that reproduces both vegetatively and by seeds. Roots can reach depths up to 8 feet. Creates dense infestations in areas devoid of other vegetation, such as roadsides and overgrazed rangelands, pastures, or croplands. (Evans Creek, roadsides only)
Cytisus scoparius Scotch broom	B	8	Perennial shrub with showy yellow pea flowers. Thrives in moderate climates in sandy soils in full sunlight. Adaptable to pastures, cultivated fields, roadsides, waterways, and recently logged lands. Reproduces both vegetatively and by seed. Seeds can remain viable in the soil for more than 80 years. (Old Ferry Road and Evans Creek)
Centaurea solstitialis Yellow star-thistle	B	52	Annual or biennial thistle that reproduces from seeds. Seed head contains sharp spines. Primarily infests grasslands, pastures, shrub steppe, open woodlands, and disturbed habitats such as hayfields, orchards, vineyards, roadsides, and abandoned areas. The most susceptible areas in the Pacific Northwest are those with deep, loamy soils, south-facing slopes, and 12 to 25 inches of precipitation that peaks in winter or spring. The foothills of Jackson County provide ideal habitat for this species. One plant can produce more than 10,000 seeds. (Butte Falls Highway, Old Ferry Road, West Shady Cove, Evans Creek, Evans Creek East, Gold Hill/Highway 234)
Hedera helix English ivy	B	1	Perennial, woody, evergreen vine. Grows rapidly to engulf trees and other vegetation. Has extensive but shallow root system that leaves soil prone to erosion after other species are displaced. Grows in urban or rural forested areas. Adapted to many light and soil conditions. (Gold Hill/Highway 234)

3.8.6 Environmental Consequences

3.8.6.1 Effects of Alternative 1 (No Action) on Botanical Resources

Direct and Indirect Effects

Threatened and Endangered Plants

Under Alternative 1, no fuels reduction or ground disturbance would occur that could potentially impact *Fritillaria gentneri* plant sites. No sites of the Federal Endangered species *Limnanthes floccosa* ssp. *grandiflora* or *Lomatium cookii* occur in the Project Area. Implementation of this alternative would be "no affect" to these three T&E plants.

Sensitive Vascular and Nonvascular Plants

Under Alternative 1, no fuels reduction or ground disturbance would occur that could potentially impact Sensitive vascular or nonvascular plant sites; therefore, they would not trend toward listing.

There may be some indirect effects to Bureau Sensitive vascular or nonvascular species if fuels reduction does not occur in the proposed units, although they are not great enough to result in the species trending toward listing. Vegetation would continue to grow and create dense fuels conditions in some plant communities. A wildfire burning through forested stands containing dense vegetation and fuel ladders could result in mortality of many or all overstory trees. Loss of whole stands would reduce the amount of suitable habitat for some Special Status plants, such as *Cypripedium fasciculatum*, and negatively impact populations, either directly from heat or fire damage to above or below ground plant parts or seeds or indirectly through the removal of canopy cover, resulting in changes to microclimate conditions. These stands would eventually provide habitat for Special Status plants as new trees grew and formed a canopy layer. Whether Special Status plant populations would exist in those stands would depend on plant survival or establishment of new populations from intact populations outside the fire area. It is unlikely that fires would burn through and extirpate all 1,175 populations of *Cypripedium fasciculatum* in the Medford District.

Under the No Action Alternative, conifers and shrubs would continue to encroach around the edges and into meadows and oak woodlands, diminishing the extent of these habitats for Special Status plants that depend on more open canopy conditions, such as *Fritillaria gentneri*, *Ranunculus austro-oreganus*, *Carex serratodens, Illiamna latibracteata, Limnanthes floccosa* ssp. *bellingeriana, Nemacladus capillaris, Plagiobothrys austiniae*, and *Plagiobothrys greenei*. Populations of these species could diminish in size if shaded out by encroaching trees and shrubs. However, if this was observed, habitat restoration could be implemented at sites under a separate NEPA document to improve conditions and prevent populations from being extirpated.

Sensitive Fungi

No habitat altering or ground disturbing activities would be implemented under Alternative 1 that could potentially impact Sensitive fungi; therefore, they would not trend toward listing.

Unique Habitats and Uncommon Species

Under the No Action Alternative, no habitat altering or ground disturbing activities would occur to the unique habitats or uncommon nonvascular species in the Project Area.

Noxious Weeds

Under the No Action Alternative, no ground disturbance or vegetation removal would occur that would create a risk of introducing or spreading noxious weeds or create conditions conducive to weed invasion. The background rate of noxious weed spread as a result of ongoing activities in the Project Area, described in Table 3-18, would continue and the BLM would continue to document and treat noxious weed populations, as directed in the Medford District ROD/RMP (USDI 1995, p. 92-93) and in the *Medford District Integrated Weed Management Plan*.

Cumulative Effects

Past activities in the Project Area that may have affected Special Status plants and contributed to the introduction and spread of noxious weeds include road building, farming, timber harvest, rural development, quarry development, mining, grazing, fuels reduction, wildfire and suppression activities, recreation, vehicular travel, and natural processes.

The BLM expects current and foreseeable future activities in the Project Area to be similar to past activities. Planned activities on BLM-managed lands include maintenance underburning on up to 1,000 acres per year in units scattered across the Butte Falls Resource Area; grazing in the Butte Falls Highway, Southeast Shady Cove, Old Ferry Road, and Evans Creek East Project Areas; and silvicultural treatments on early and mid-seral stands scattered across the r Butte Falls Resource Area. Timber harvest would continue to implement the Medford District's existing ROD/RMP and would include timber sales proposed in the Evans Creek fifth field watershed. These sales would be a combination of regeneration, selection harvest, density management, and thinning treatments on matrix lands. Treatments would be considered on approximately 2,000 acres. Riparian thinning would be considered in riparian reserves within the thinned timber stands. Logging systems used for harvesting this timber would include tractor, skyline cable, and helicopter yarding. These logging systems would be based on Best Management Practices (BMPs) as described in the 1995 ROD/RMP.

The BLM protects Special Status plant populations from planned management activities by surveying prior to implementation and designing protection measures. However, impacts could occur from unplanned events such as wildfire, recreation, and trespasses.

The BLM also applies PDFs to management activities to reduce the introduction and spread of noxious weeds on BLM-administered lands. However, ongoing activities on adjacent private lands, such as timber harvest, road building, and development; as well as vehicular travel, recreation, and natural processes, also create suitable conditions and conduits for the introduction and spread of noxious weeds in the Project Area.

3.8.6.2 Effects of Alternative 2 on Botanical Resources

Direct and Indirect Effects

Threatened and Endangered (T&E) Plants

The 2008-2013 Programmatic Consultation (USDI BLM 2008, USDI FWS 2008) covers fuels reduction activities and Project Design Criteria (PDCs) were developed to minimize or avoid potential impacts. Required PDCs for fuels reduction include the following:

- Surveying suitable habitat in the Project Area.
- Broadcast burning following fuels reduction treatments through buffered occurrences only during the dormancy period (July-February).
- For hand treatment of fuels reduction, buffering populations a minimum of 25 feet from occurrence boundary. Hand slashing through the buffer is allowed if completed during dormancy period. A minimum 40 percent canopy coverage of trees and shrubs must be maintained and all cut material piled outside the buffer.
- Stacking hand piles a minimum of 25 feet from the buffer edge

All proposed fuels reduction units in Alternative 2, except Pleasant Re-fry, are within the range of *Fritillaria gentneri*. Many of the units contain suitable habitat. Because the BLM has or will meet the required Project Design Criteria prior to project implementation, this project "***may affect,*** but is ***not likely to adversely affect***" the T&E plant *Fritillaria gentneri*. Although some of the proposed fuels units are within the range of *Limnanthes floccosa* ssp. *grandiflora*, they do not contain habitat for this Endangered species and surveys have not discovered any populations on BLM-administered lands in the Butte Falls Resource Area. No proposed fuels units are within the range of or contain suitable habitat for *Lomatium cookii*. The proposed fuels reduction activities in Alternative 2 would be "**no affect**" to *Limnanthes floccosa* ssp. *grandiflora* or *Lomatium cookii* because no plants occur in the Project Area.

Sensitive Vascular and Nonvascular Plants

Fuels reduction activities create potential benefits and harm to Bureau Sensitive vascular and nonvascular plants. Because the BLM surveys for Special Status plants prior to implementing management actions and develops protection measures to prevent populations from extirpation, the fuels reduction activities proposed in Alternative 2 would not trend Bureau Sensitive vascular or nonvascular plant species toward listing.

Special Status plants that occur in the Project Area likely evolved with historically frequent fire regimes and are adapted to periodic, low intensity wildfires during late summer and early fall when plants are dormant. Fire suppression has resulted in a buildup of fuels in some areas that would burn at a higher intensity and severity if a wildfire occurred. Reducing hazardous fuels and reintroducing fire into these ecosystems would logically be a positive benefit to Special Status plants because they would return the plant communities to more natural conditions. However, because of high fuel loads, changes in plant community composition from native species to native and nonnative species, and fuels reduction methods that do not mimic natural processes, not all proposed activities and consequences of the proposed activities would benefit Special Status plants. See Table 3-20 for a summary of specific threats and protection measures for each species.

Manually thinning understory trees and shrubs and pruning the remaining conifers in conifer stands could benefit Special Status vascular and nonvascular plants growing in that habitat by increasing forest resiliency to wildfires, reducing the risk of stand-replacing events, and reducing the potential magnitude of damage to plants. A fire burning through dense understory vegetation results in more intense heat with higher soil scorching and potentially the loss of some or all overstory canopy.

The proposed thinning would leave overstory trees. However, removing understory trees and shrubs would change microsite environmental conditions, although to a lesser degree than removing canopy cover. Changes could include warmer air and soil temperatures, less relative humidity, and less soil moisture. These drier conditions could negatively impact *Cypripedium fasciculatum* or *Porella bolanderi* which depend on cooler, moister conditions.

The BLM has monitored or revisited some *Cypripedium fasciculatum* populations in the Medford District BLM over the last 10 years. Many sites have no or fewer flowering plants than in the past. However, new populations are discovered every year and some populations have shown an increased number of plants. The reason(s) for the diminishing number of plants are unknown, but may be due to encroaching brush and small conifers. Opening up the understory canopy cover at sites containing dense vegetation may benefit the populations by providing more filtered light. Because there are many populations outside the fuels treatment units, the BLM project botanist proposes thinning through some

Cypripedium fasciculatum sites in the proposed units. The BLM botanist would examine populations on a site-by-site basis and develop buffer sizes to allow thinning around the population in order to reduce the risk of high intensity wildfire, while still maintaining adequate microsite conditions and preventing direct damage to plants.

Thinning small diameter trees and shrubs in oak woodlands, chaparral, and around meadow openings could benefit Special Status plants in those habitats by removing encroaching vegetation that diminishes the extent of those habitats and competes with these species for resources. *Fritillaria gentneri*, *Ranunculus austro-oreganus*, *Carex serratodens*, *Limnanthes floccosa* ssp. *bellingeriana*, *Nemacladus capillaris*, *Plagiobothrys austiniae*, and *Plagiobothrys greenei* all grow in more open habitats and could benefit from some thinning.

On the other hand, thinning surrounding vegetation could adversely impact *Fritillaria gentneri* populations because it would remove protective shrub cover. It is a highly favored browse species for deer. Blooming plants are often observed protected under *Ceanothus cuneatus* (wedgeleaf ceanothus) or other shrubs. Removing these shrubs would expose them to potential wildlife browsing. However, browsing may not pose a high risk to population survival because often only the flowers are browsed and the leaves are left, allowing for continued photosynthesis and replenishing of carbohydrate reserves to the bulb. In addition, this species' main method of reproduction is asexual via reproduction and division of underground bulbs, which are not directly impacted by browsing. Seed production and seed viability are minimal and irregular.

Population monitoring of this species over the last 10 years shows a declining trend in flowering plants in approximately 60 percent of the monitored populations. The BLM has monitored 3 of the 5 sites in the Project Area for 11 to 12 years. The total number of flowering plants per site has ranged from 0 to 3, but they have flowered for only 2 to 4 years. No flowering plants were observed in the remaining years. Two new populations documented in 2009 had 1 and 3 flowering plants.

One of the three monitored sites contains a dense understory shrub layer of manzanita and poison oak and an overstory of Oregon white oak. A second site is in an Oregon white oak woodland with an open understory. A wildfire burned through it in 2004. The third site is in an opening in a mixed hardwood-conifer stand where a fire burned in 2000 within 100 feet of the plants. There appears to be no correlation between these events, differing site conditions, and flowering. Therefore, buffers for the *Fritillaria gentneri* sites would be determined on a site-by-site basis, depending on site conditions and the proposed fuels reduction prescription.

Hand piling and burning the slash would reduce the amount of woody material on the ground that could carry fire. However, burning handpiles creates intense heat in localized areas. An average of 4 percent of the area would be impacted by burn piles, based on an average pile size of 6 feet by 6 feet (36 square feet) and an average of 50 piles per acre. Personal observation of these burn piles indicates it takes several to many years for vegetation to grow back. Nonnatives and noxious weeds have an advantage in establishing before native species because of their reproductive strategies. They produce many seeds and have a high rate of germination. They germinate, become established, and produce seed quickly. Some species establish rosettes in the fall, bolt in the spring, and produce deep and extensive root systems that preempt resources. The risk that nonnative and noxious weeds would increase after pile burning is higher in areas that already contain populations of nonnative plants or noxious weeds. In the Project Area, these include oak woodlands, chaparral, and meadow plant communities. Mixed hardwood-conifer and conifer stands generally do not contain invasive, exotic annual grasses and contain few noxious weeds.

Removal of nonnative annual grasses during pile burning creates an opportunity to increase native grass or forb species through seeding piles after burning. This has been successful in the past, in part because the flush of nitrogen after burning aids plant growth. The limiting factor would be availability of site-specific native grass seed. Seeding with native species that are appropriate to the site would create an opportunity to restore oak woodland, chaparral, or meadow plant communities. However, using native species that do not naturally occur in those plant communities may prevent invasion by nonnatives, but would not restore native plant communities and may not successfully compete with nonnative species due to their unsuitability to the site. Because not enough appropriate seed is available for all burn piles, priority areas for seeding would be areas where Special Status plant sites occur and areas with noxious weed populations.

The BLM anticipates maintenance underburning would occur in forested units 3 to 10 years after the initial fuels reduction treatments. Because this would occur after removal of dense vegetation, fire should burn through the understory more quickly and at a lower intensity than before the fuels reduction. Most Special Status plant species bloom in early spring and are dormant by late summer and fall when wildfires naturally occur. Even rare species likely tolerate wildfire without suffering long-term damage to their populations. Some species, such as *Illiamna latibracteata*, benefit from wildfire because it scarifies their seeds, promotes germination, and removes competing vegetation.

If the underburns are conducted when Special Status vascular plants are dormant, it should not negatively impact populations. Because vegetation in the spring is green and contains moisture, spring prescribed burns can move slower and allow a more intense burn. This could damage living plant tissue, as well as seeds and microorganisms in the soil. This out-of-season burn can negatively impact spring blooming species by killing them and preventing seed production. Less heat is necessary to kill plant tissue when the moisture content is high during the growing season. Prescribed fires in late fall to early winter, although not at historically natural times, would be less damaging to annual spring blooming species because they would burn before the plants started growing. Burns conducted during the winter and spring months are generally patchy in nature and burn at higher severity and intensity in some locations and less in others. Since the pattern of burn cannot be predicted at any given location, the BLM project botanist chooses to be conservative in forming protection measures for Special Status plants and assumes the fire will burn in a worst case scenario at populations. If underburns are conducted during the plants' growing season, Special Status sites would be buffered to prevent damage to plant tissue.

Because the liverwort *Porella bolanderi* is actively growing in the wet winter and spring months, it would be vulnerable to damage from flames or radiant heat from burning piles or underburning at that time. The BLM would buffer those sites to protect them against direct or indirect effects.

Broadcast burning would occur on approximately 900 acres in the Butte Falls Highway Project Area in chaparral and oak woodland plant communities where cut brush is burned in lieu of piling and burning. Burning would occur from late fall to spring. The Butte Falls Highway Project Area contains 5 of the 11 Special Status plant species. *Ranunculus austro-oreganus* is associated with Oregon white oak woodland; *Nemacladus capillaris* is associated with dry openings in oak woodlands and chaparral; and *Plagiobothrys austiniae*, *Plagiobothrys greenei*, and *Limnanthes floccosa* ssp. *bellingeriana* are associated with vernally wet scabland openings within chaparral and oak woodlands. All five species grow in grassy openings where broadcast burning could be used. Burning could negatively impact Special Status plants if it occurred during their season of growth and seed production, which is April and May for four species and June to July for one. Naturally occurring fires burn through meadows in

late summer or early fall when grasses and forbs are dormant and dry. Because the fuels are dry, the fire burns quickly and only shallowly heats or scorches soil, leaving seeds and below ground plant parts undamaged. As discussed above, a spring burn can be patchy with variable burn intensity and variable impacts to soil and vegetation, depending on vegetation type, moisture content of vegetation, relative humidity, and temperature.

The Special Status plant populations in the Butte Falls Highway project could also be indirectly impacted by an increase in nonnative or noxious weed species as a result of removing vegetation during broadcast burning. On one hand, broadcast burning poses fewer potential impacts compared to pile burning because the fire is spread across the landscape in a more natural manner with less intense, localized effects to soil and vegetation. Removing the thatch of nonnative annual grasses would benefit native perennial bunchgrasses and Special Status plants by giving them more light exposure. Vegetation recovery would be faster than in burn pile scars. On the other hand, thinning shrubs followed by broadcast burning can leave larger, newly disturbed areas susceptible to establishment by exotic annual grasses and noxious weeds. The nonnative annual grass medusahead (*Taeniatherum caput-medusae*) and the noxious weed yellow star-thistle (*Centaurea solstitialis*) are widespread in four of the six sections of the Project Area. These nonnative species could negatively impact Special Status plants by competing with them for light, water, space, and nutrients.

When buffers are used as a protection measure, the size would be determined on a site-by-site basis. Factors considered in determining buffer size include the species, its reproductive biology, environmental requirements, habitat conditions at each site, and the proposed treatment. Buffer size may differ for thinning and for prescribed burning activities. If underburning or broadcast burning are conducted when Special Status species are actively growing, sites would be buffered to prevent damage to plants.

Table 3-20. Summary of Potential Effects of Hazardous Fuels Reduction Activities on Special Status Plants, and Protection or Mitigation Measures

Scientific/ Common Names	Potential Effects of Fuels Reduction	Protection or Mitigation Measures
Arabis modesta Rogue Canyon rockcress	Direct damage to plants if slash piles placed on top of plants. Thinning dense vegetation around the site and underburning could benefit the population by removing competing vegetation (comparison of effects with *Arabis holboellii*, Metlen et. al 2006, p. 5).	25-foot buffer around plants to prevent damage to plants from flames or radiant heat from burn piles. Underburning OK through site when plants are dormant (October-February)
Carex serratodens Sawtooth sedge	Fire-tolerant species. Population in "Southeast Shady Cove" responded favorably to a previous wildfire and is now being shaded out by blackberries and other shrubs. Direct damage to plants if handpiles placed on top of plants.	25-foot buffer around plants to prevent damage to plants from flames or radiant heat from burn piles. Underburning OK through site when plants are dormant (October-February)

Table 3-20. Summary of Potential Effects of Hazardous Fuels Reduction Activities on Special Status Plants, and Protection or Mitigation Measures

Scientific/ Common Names	Potential Effects of Fuels Reduction	Protection or Mitigation Measures
Cypripedium fasciculatum Clustered lady-slipper orchid	Role of fire in ecology of species is unknown. Thinning could change microclimate environmental conditions which would stress plants and result in reduced reproductive capability. Direct damage to above or below ground plant parts if handpiles located close to or on top of plants. Underburning could also cause damage to above ground plant parts when plant is actively growing or to shallow underground rhizome, depending on amount of duff and intensity and severity of fire. (Seevers and Lang in USDA, USDI 1998, p. 2, 7-9)	50-100 foot buffers around populations to maintain environmental conditions, including downed logs, snags, and duff layer for soil moisture and mycorrhizal associates. Underburning OK through site when plants are dormant (October-February) but determined on a site-by-site basis, depending on fuel loads and duff layer
Fritillaria gentneri Gentner's fritillary	Removing dense shrubs may benefit populations by maintaining the species' preferred open woodland/grassy understory habitat. Thinning or burning that removes existing shrubs or small trees may also release nonnative understory species, which could proliferate and negatively impact *Fritillaria gentneri* through competitive exclusion. Plants or bulbs could be directly damaged by flames or radiant head from burn piles. Underburning could damage above or below ground plant parts if burning occurs when plants are actively growing or if fire intensity is high; otherwise bulbs are protected from fire below ground when dormant. (USDI FWS 2003, p. 26-27)	25-foot no-treatment buffer and no burn piles around plants. Underburning OK through site when plants are dormant (October-February).
Illiamna latibracteata California globe-mallow	Germinates after fire and is shaded out when competing shrubs resprout and overtop it. Would benefit from thinning and underburning. (Carothers and Kalt 2009, p. 1 and 12)	None

Table 3-20. Summary of Potential Effects of Hazardous Fuels Reduction Activities on Special Status Plants, and Protection or Mitigation Measures

Scientific/ Common Names	Potential Effects of Fuels Reduction	Protection or Mitigation Measures
Limnanthes floccosa ssp. *bellingeriana* Bellinger's meadowfoam	Spring blooming annual probably adapated to flashy fall burns when dormant. Direct damage to plants or seeds in soil if burn piles placed on top of plants. Thinning around population would benefit plants by removing encroaching vegetation.	No burn piles in meadow. OK to burn through population when plants are dormant (October-February).
Nemacladus capillaris Slender nemacladus	Summer blooming annual probably adapted to flashy fall burns when dormant. Direct damage to plants or seeds in soil if burn piles placed on top of plants.	No burn piles in openings. OK to burn through population when plants are dormant (October-May)
Plagiobothrys austiniae Austin's popcorn flower	Spring blooming annual probably adapted to flashy fall burns when dormant. Direct damage to plants or seeds in soil if burn piles placed on top of plants. Thinning around population would benefit plants by removing encroaching vegetation.	No burn piles in meadows OK to burn through population when plants are dormant (October-February)
Plagiobothrys greenei Greene's popcorn flower	Spring blooming annual probably adapted to flashy fall burns when dormant. Direct damage to plants or seeds in soil if burn piles placed on top of plants. Thinning around population would benefit plants by removing encroaching vegetation.	No burn piles in meadows OK to burn through population when plants are dormant (October-February)
Porella bolanderi	Vulnerable to damage by flames when actively growing due to thin cellular tissue structure. Thinning understory vegetation could result in drier and hotter environmental conditions which could negatively impact species.	25-50 foot no-treatment buffer around site to maintain environmental conditions and prevent flames from burn piles or underburning from scorching rock containing liverwort.
Ranunculus austro-oreganus Southern Oregon buttercup	Spring blooming perennial probably adapted to fall burns when dormant. Direct damage to plants or seeds in soil if burn piles placed on top of plants. Thinning around population would benefit by removing encroaching vegetation.	No burn piles within population OK to burn through population when plants are dormant (October-February).

Sensitive Fungi

It is unknown if Bureau Sensitive fungi are present in the hazardous fuels reduction units because the BLM has not surveyed the units for fungi. Suitable habitat exists for some species in forested units; although, it is unlikely populations are present because of their rarity across the Northwest Forest Plan area. If present, they could be directly or indirectly affected by actions proposed under Alternative 2. However, the BLM assumes that protecting known sites (current and future) and conducting landscape level strategic surveys would prevent this project and other projects from trending Bureau Sensitive species toward listing.

Activities that remove overstory trees or remove, disturb, or compact the top layer of organic material or mineral soil negatively impact fungi. The main and most extensive part of a fungus consists of a mycelia network that resides in the top few inches of mineral soil. Mycelial networks often connect multiple trees through their root systems. In one study, mycelia networks ranged in size from 1.5 to 27 square meters (Dahlberg and Stenlid 1995).

Thinning would only remove understory shrubs and trees less than 8 inch DBH. It would not change the overstory canopy layer or remove host trees that may have mycorrhizal associations with fungi. Fungi may develop mycorrhizal associations with earlier seral trees, but the majority of associations have likely developed over time with later seral conifers. Thinning to remove hazardous fuels in forest habitats would reduce potential impacts to fungi, if present, in the event of a high intensity wildfire. Reducing fuel loads is expected to minimize the risk of a high intensity, stand-replacing wildfire. A lower intensity, lower severity fire would cause less potential damage to soil, duff, and fungal mycelia. The objective of fuels reduction is to return fire regimes to more natural, historic conditions. Because fungi evolved with the plant communities where they occur, they are likely adapted to the historic fire regime and have strategies to survive wildfire events, such as fruiting outside the window of naturally occurring wildfires and establishing extensive mycelial mats that increase the odds that hyphae will persist in unburned or lightly burned areas.

While thinning would reduce the risk of damaging fungi from high intensity wildfire, burning handpiles and out-of-season underburning could pose some risk to Bureau Sensitive fungi, if present in the units. Burning concentrated piles of slash creates an intense burn in localized areas. If rare fungal mycelia are present beneath slash piles, they could be damaged during burning. The estimated amount of area impacted by burn piles is an average of 4 percent of the total area. Because they are rare and because the area impacted would be a small percentage of the landscape, the likelihood of Bureau Sensitive fungi being present under one of the piles is small. Mycelia form extensive underground mats and a 6-foot by 6-foot pile would not likely cover an entire mycelia. Damage to the mycelia at one location may break hyphal connections, but would not destroy the entire mycelia mat. Over time the mycelia would reestablish connections with the fine roots of conifers.

Underburning would carry fire across the landscape and would not create intense localized effects like pile burning would. Underburning conifer stands after removal of hazardous fuels should result in a patchy, low intensity burn; although, intensity would depend on seasonality, soil and vegetation moisture content, and other environmental conditions. The risk of damage to Bureau Sensitive fungi from underburning would occur from more intense burns in patchy areas that result in consumption of duff and scorching of soil. Loss of litter and organic matter results in reduced moisture retention capability, loss of nutrient sources, and changes in fungal species diversity and abundance (Amaranthus et al. 1996). Burning in late fall and spring when fungi are fruiting could also result in damage to sporocarps

and short-term reduction of reproductive capacity. These effects would be short-term and small scale due to the patchy nature of late fall to spring underburning.

Broadcast burning would not occur in forested stands, so it would have no potential effects on Bureau Sensitive fungi.

Unique Habitats and Uncommon Species

In the Project Area, 9 of the 11 Bureau Strategic and uncommon nonvascular species grow on rocks. Fuels reduction activities would have no effect on the populations growing on rocks in open habitats where no thinning would occur. Thinning understory shrubs and trees in conifer stands would not impact species located on shaded rocks because the overstory canopy cover would be retained. The only potential impacts to these species would be from flames or radiant heat during slash pile burning or underburning. Slopes are steep in the units where the populations occur and flames from piles or an underburn could move uphill to scorch rock faces. Lichens and bryophytes are actively growing and reproducing during the wet winter and spring months and would be vulnerable to tissue or leaf damage when burning would occur. These populations could be protected by placing burn piles at least 25 feet away and by draping fire shelter material over populations on rocks that could be impacted during an underburn.

Leptogium teretiusculum and *Leptogium siskiyouensis* are tiny, gelatinous lichens that grow on the trunks of canyon live oak and California black oak in the Project Area. In almost all cases, a population consists of lichens on one tree. Several of the substrate trees are less than 8 inches DBH so they could potentially be cut, piled, and burned. To prevent extirpation of these populations, we could flag these individual trees as leave trees. Flames from burn piles could also impact the lichens that would be actively growing during the wet winter months, so burn piles could be placed a minimum of 25 feet away from the trees.

Noxious Weeds

Studies have shown that fuels reduction treatments can result in increased cover and percentage of nonnative plants, including noxious weeds (Perchemlides et al. 2008; Vance et al. 2006; Knapp et al. 2007; Di Tomaso and Johnson 2006; Sikes 2005). Removing shrubs and conifers under 8 inches and underburning or broadcast burning opens areas to invasion by nonnative species, especially if a seed source already exists in the soil or in nearby populations. Noxious weeds have reproductive strategies that facilitate quick establishment after disturbance. They produce many seeds and have a high rate of germination. They germinate, become established, and produce seed quickly. Some species establish rosettes in the fall, bolt in the spring, and produce deep and extensive root systems that preempt resources. Burn pile scars create especially favorable sites for invasion by nonnative plants because all vegetation is removed and most seeds in the soil bank are scorched and rendered unviable.

The goal of the proposed underburning and broadcast burning is to remove hazardous fuels, either dead material after manual thinning or uncut live material. While prescribed burning may be used as a tool to reduce or control invasive plants, to be successful, it must be timed very specifically to cause damage to the target species. To be most effective, burning is used in combination with other treatments such as follow up spraying with herbicides. In general, plants are most susceptible to damage from fire when they are actively growing and before they have produced and set seed. Burning at one season of the year may cause damage to some species but favor growth and germination of other species (Di Tomaso and Johnson 2006, p. 7-39). The results of one study indicated it was not the season of year (fall versus

spring) of the burn that influenced impacts on vegetation, but the intensity and severity of the burn (Knapp et al. 2007).

The proposed prescribed burning in the various Project Areas included in this EA would occur between fall and late spring (October to May). Timing of the burns would depend on factors including soil and fine fuels moisture and air quality. For these reasons, the effects of prescribed burning on nonnative versus native plant species cannot be predicted for specific locations in the proposed Project Areas. There may be some benefits to native plants or some negative impacts to nonnative plants, but they would be incidental. Therefore, the BLM project botanist must assume a worst-case scenario of the effects of fuels reduction activities on the spread of noxious weeds. Table 3-21 displays the specific potential direct and indirect effects of fuels reduction on each noxious weed species and the proposed mitigation measures.

The plant habitats most at-risk for increases in noxious weeds after fuels treatments are meadows, chaparral, oak woodlands, and some mixed-hardwood conifer woodlands. Butte Falls Highway, West Shady Cove, Gold Hill/Highway 234, and some Evans Creek units contain the most extensive noxious weed populations in the Project Area. Strategies to minimize the risk of spreading noxious weeds in the fuels units include treating existing populations before fuels reduction activities, seeding burn pile scars, leaving some understory canopy cover in highly infested areas, and seeding areas that contain burn piles or have been broadcast or underburned. The limiting factor for seeding is availability of site appropriate native seed. Seeding with native species that are appropriate to the site would create an opportunity to restore oak woodland, chaparral, or meadow plant communities. However, using native species that do not naturally occur in those plant communities may prevent invasion by nonnatives, but would not restore native plant communities and may not successfully compete with nonnative species over the long term due to their unsuitability to the site. Priority areas for seeding with native species would be areas with existing noxious weed populations.

In Project Areas where noxious weeds are limited to roadsides, workers could transport seeds on their clothing or equipment from those populations into the units during fuels reduction activities. Seeds could also blow into or be transported via wildlife into newly thinned areas. Removing vegetation in the units would open them to invasion by noxious weeds from adjacent areas. Treating these populations prior to implementation of fuels reduction work would reduce this risk.

Table 3-21. Potential Effects from Hazardous Fuels Reduction Treatments on Noxious Weeds and Proposed Mitigation Measures

Scientific/ Common Name	Threats from Treatments	Treatment Area and Mitigation Measures
Tribulus terestris Puncturevine	Could be carried from roadside into units on worker's clothing or equipment.	Butte Falls Highway (roadside only) • Treat prior to fuels reduction
Chondrilla juncea Rush skeletonweed	Likes open canopy, could invade areas where vegetation is removed.	Evans Creek (roadside only) • Continue treatment of populations
Cytisus scoparius Scotch broom	Sprouts from the stem after top-kill or mechanical removal. Increased germination of seed bank after fire. Seed bank germinates with removal of competing overstory vegetation. (Zouhar 2005, p. 17)	Old Ferry Road and Evans Creek • Maintain overstory canopy cover near populations • Continue treatment prior to fuels reduction • Follow up monitoring and treatment after fuels reduction
Centaurea solstitialis Yellow star-thistle	Burning creates conditions favorable to an increase of yellow star-thistle. Fire kills plants immediately. Fire stimulates germination of seed in soil bank. Fire reduces competition. Fire reduces the thatch layer, exposes mineral soil, and increases sunlight. Seeds germinate quickly from seed in soil bank. (Zouhar 2002, p. 13)	Butte Falls Highway and West Shady Cove (heavy infestations) East Evans Creek, Gold Hill/ Highway 234 (some populations) • Continue treatments before fuels reduction. • Monitor and continue treating after fuels reduction. • Seed burn piles and broadcast burned areas with appropriate seed as available.

Cumulative Effects

Past activities in the Project Area that may have affected Special Status plants and contributed to the introduction and spread of noxious weeds include road building, farming, timber harvest, rural development, quarry development, mining, grazing, fuels reduction, wildfire and suppression activities, recreation, vehicular travel, and natural processes.

Current and foreseeable future activities in the Project Area are expected to be similar to past activities. Planned activities on BLM-managed lands include maintenance underburning on up to 1,000 acres per year in units scattered throughout the Butte Falls Resource Area; grazing in Butte Falls Highway, Southeast Shady Cove, Old Ferry Road, and Evans Creek East Project Areas; and silvicultural treatments on early and mid-seral stands scattered across the Butte Falls Resource Area. Timber harvest would continue to implement the Medford District's existing ROD/RMP and includes timber sales proposed in the Evans Creek fifth field watershed. These sales would be a combination of regeneration, selection harvest, density management and thinning treatments on matrix lands. Treatments would be

considered on approximately 2,000 acres. Riparian thinning would be considered in riparian reserves within the thinned timber stands. Logging systems used for harvesting this timber would include tractor, skyline cable and helicopter yarding. These logging systems would be based on BMPs as described in the ROD/RMP.

The BLM protects Special Status plant populations from planned management activities by surveying prior to project implementation and designing protection measures. However, impacts could occur as a result of unplanned events, such as wildfire, recreation, and trespass.

The BLM also applies PDFs to management activities to reduce the introduction and spread of noxious weeds on BLM-managed lands. However, ongoing activities, such as vehicular travel; recreation; timber harvest, development and road building on adjacent private lands; and natural processes also create suitable conditions and conduits for the introduction and spread of noxious weeds.

Fuels reduction could add to noxious weeds impacts where thinning and broadcast burning are followed closely by grazing. Butte Falls Highway is the only Project Area where broadcast burning would occur. Some of the units are in grazing allotments with spring pastures. Thinning shrubs and small trees would occur in units containing large areas of wedgeleaf ceanothus, meadows, and oak woodlands. Removing woody vegetation followed by broadcast burning could leave newly disturbed areas vulnerable to invasion by nonnative annual grasses or noxious weeds. The amount of herbaceous vegetation remaining that livestock would graze would depend on the intensity and severity of the burn. Native bunchgrasses persist after a burn better than annual grasses due to their larger clumped leaves. If livestock were released after a broadcast burn and grazed the remaining bunchgrasses, bunchgrasses would be reduced and annuals and noxious weeds would be favored for reestablishment. To prevent added pressure on native bunchgrasses and reduce the risk of increasing nonnative grasses and noxious weeds, grazing would be rested from an allotment if livestock turn-out time corresponded with a burn and it was determined insufficient forage was available for them at that time.

Added to the past, present, and foreseeable future activities in the Project Area, the fuels reduction activities proposed in Alternative 2 would not add cumulative effects to Special Status plants because the BLM has searched for, located, and designed protection measures for known populations.

The use of PDFs and ongoing noxious weed treatments in the Butte Falls Resource Area would minimize cumulative effects of fuels reduction activities on noxious weeds.

Added to past, present, and reasonably foreseeable future activities in the Project Area, the actions proposed under Alternative 2 would not add to effects on Bureau Sensitive fungi, if present in the Project Area. The BLM assumes that protecting known sites (current and future found), in addition to conducting large-scale inventories throughout the Pacific Northwest, will ensure this project and future projects would not contribute to the need to list Sensitive fungi (USDI 2004, p. 5-2).

3.9 Wildlife

3.9.1 Methodology

The wildlife analysis area encompasses the Butte Falls Hazardous Fuels Reduction Project Area. The BLM project wildlife biologist specifically considers the effects of the proposed actions on the terrestrial wildlife occurring on the 7,900 acres of BLM-administered land within the Project Area.

3.9.2 Assumptions

- If any threatened or sensitive raptors are found nesting in or near project units, fuels treatments will only occur during specified months and at specified distances of nesting northern spotted owls and other nesting raptors.
- Patches of untreated ground will remain, riparian vegetation will be buffered, and not all hand piles will be burned, providing shelter for small mammals and song birds until the understory vegetation regrows.
- If no threatened and endangered (T&E) or special status species or their habitat will be impacted by the fuels treatment, or the area is outside the range for the species, then no further analysis is needed. If a T&E or special status species is known or suspected to be present and habitat is proposed to be disturbed, then the species will be analyzed.

3.9.3 Affected Environment

3.9.3.1 Northern Spotted Owl

The Medford District ROD/RMP and the Northwest Forest Plan provide a network of connectivity/diversity blocks, 100-acre known northern spotted owl activity centers, late-successional reserves (LSR), connecting riparian corridors, and 15 percent late-successional forest retention on Federal lands in fifth field watersheds. The proposed actions would occur within lands designated as matrix or riparian reserve by the Medford District ROD/RMP.

The Medford District ROD/RMP requires the BLM to maintain late-successional forest conditions in 25 to 30 percent of Federal forested lands within matrix lands designated as connectivity/diversity blocks. The size and arrangement of habitat within a block will provide effective habitat to the extent possible (USDI 1995, p. 40). Approximately 160 acres proposed for thinning are within a connectivity/diversity block in Township 33 South, Range 2 West, section 29.

The Northwest Forest Plan designated 100 acres of the best habitat on Federal lands to be retained as close as possible to the spotted owl nest site, or owl activity center, for all sites known as of January 1, 1994. This was intended to preserve an intensively used portion of the breeding season home range close to a nest site or center of activity (USDI 1995, 32; USDA and USDI 1994, C-10). Fuel hazard reduction units are within 0.25 miles of 6 known 100-acre activity centers; 3 have been vacant for 3 years or more.

The Project Area encompasses nesting, roosting, and foraging (NRF); dispersal; and nonhabitat for the federally-listed, threatened, northern spotted owl (Table 3-22). Approximately 3,740 acres are considered to be dispersal and approximately 152 acres are NRF habitat; the remaining acres are nonhabitat. No LSR or Critical Habitat Units (CHU) for the spotted owl or the vernal pool fairy shrimp, another federally-listed threatened species, is present in the project units.

Table 3-22. Northern Spotted Owl Habitat Types

Habitat Type	Description
Type 1: Suitable Nesting, Roosting, Foraging (NRF)	NRF habitat meets all spotted owl life requirements. These forests have a high canopy closure (greater than 60 percent), a multi-layered structure, and large overstory trees. Deformed, diseased, and broken-top trees, as well as large snags and down logs, are also present.
Type 2: Dispersal	This habitat is not suitable for nesting, but provides spotted owls with roosting, foraging, and dispersal habitat. Canopy closure is usually greater than 40 percent but with a more uniform structure and moderately-sized overstory trees. Deformed trees, snags, and down wood are less prevalent than in Habitat Type 1.

3.9.3.2 Bureau Special Status Wildlife Species

Bureau Special Status wildlife species may be present within the project units and are listed as "present" or "suspected" in Table 3-23. Other raptor nests, such as great gray owl and osprey, are known to be present in or near the project units.

Table 3-23. Sensitive Wildlife Species Analysis for the Butte Falls Hazardous Fuels Reduction Project

Species	Status	Presence on BLM Land			Habitat
		Medford District	Butte Falls RA	Project Area	
Threatened and Endangered					
Northern spotted owl	FT	P	P	P	• Use high canopy cover, late-successional, old-growth forests for nesting.
Vernal pool fairy shrimp	FT	P	P	A	• The only suitable vernal pools on BLM lands are on the Table Rocks. There is no vernal pool fairy shrimp habitat in the Project Area.
Bureau Sensitive, Birds of Conservation Concern, and Game Birds Below Desired Condition					
Bald eagle	BS	P	P	S	• Nest in dominant and codominant trees at forest edges and ridges, in meadows, and near rivers and lakes.
Band-tailed pigeon	GBBDC	P	P	S	• Closed canopy conifer or mixed hardwood and conifer forests are the primary nesting habitat. Their nests are mainly in Douglas-fir, but they also will nest in hardwoods and shrubs within closed-canopy conifer stands or mixed hardwood and conifer stands. Use mineral springs.
Chase sideband (mollusk)	BS	P	P	A	• Occupy late-successional forest and open talus or rocky areas, especially the lower one-third of a talus slope, and timbered stands in leaf litter and duff near coarse woody debris.
Fisher	BS	P	P	U	• Primarily use late-successional forested areas with high canopy cover.
Foothill yellow-legged frog	BS	P	P	P	• Live in and near low-gradient streams with rocky, gravelly, or sandy substrate.
Fringed myotis (bat)	BS	P	P	P	• Roost in caves, abandoned buildings, rock crevices, and trees.

Table 3-23. Sensitive Wildlife Species Analysis for the Butte Falls Hazardous Fuels Reduction Project

Species	Status	Presence on BLM Land			Habitat
		Medford District	Butte Falls RA	Project Area	
Grasshopper sparrow	BS	P	P	S	• Prefer to nest and forage in relatively dry habitats in open grasslands and grain fields, generally free of woody shrubs.
Lewis' woodpecker	BS	P	P	P	• Associated with open woodlands near streams and rivers. Habitat preference includes hardwood oak stands with scattered ponderosa pine near grassland shrub communities.
Mourning dove	GBBDC	P	P	P	• Abundant in grasslands and agricultural habitats throughout Oregon. Nests are constructed in either trees or on the ground under shrubs.
Northwestern pond turtle	BS	P	P	P	• Spend the majority of their life cycle in aquatic environments, but must leave the water to dig terrestrial nests and lay their eggs.
Olive-sided flycatcher	BCC	P	P	P	• Breed primarily within forest burns and edges where snags and scattered tall live trees are present, near shores of streams and wet areas, and at the edge between late-successional and early successional forests such as meadows and harvest units. They build their nests high in conifer trees on horizontal branches away from the trunk.
Oregon shoulderband (mollusk)	BS	P	P	A	• Found in basalt rockslides (talus), under rocks and woody debris in moist conifer forests, and in shrubby areas in riparian corridors. No strong riparian association has been identified (Burke et al. 1999). They have been found in oak woodlands and dry conifer forests west of Lost Creek Lake.
Oregon spotted frog	BS	P	S	S	• Live where there is abundant aquatic vegetation in slow streams, permanent ponds, marshes, or lake edges, and breed in very shallow water in early or mid-spring.
Oregon vesper sparrow	BS, BCC	P	P	S	• Favor dry, grassy foothills around the Rogue Valley for nesting. Habitat requirements include elevated perches for singing and an understory dominated by grasses for foraging and nesting, with small patches of woody plants and bare ground.
Pallid bat	BS	P	P	S	• Suspected to be present in the Project Area, but have not been found during mist-net surveys.
Peregrine falcon	BCC	P	P	P	• Nesting habitat is on cliffs. Present near Project Area, but outside units.
Purple finch	BCC	P	P	P	• Breed in a variety of habitats, including mixed conifer-hardwood forests, deciduous woodlands, edge habitat, riparian corridors, and vigorously regenerating clear-cuts.
Rufous hummingbird	BCC	P	P	P	• Positively associated with nectar produced by flowering plants, deciduous shrubs, and trees in early successional habitats.

Table 3-23. Sensitive Wildlife Species Analysis for the Butte Falls Hazardous Fuels Reduction Project

Species	Status	Presence on BLM Land			Habitat
		Medford District	Butte Falls RA	Project Area	
Siskiyou hesperian (mollusk)	BS	P	P	P	• Seek refuge in moist areas under rocks and large woody debris during the summer and late winter seasons, and are generally associated with mixed conifer forests with a high percentage of canopy cover.
Streaked horned lark	BS, BCC	M	M	M	• Commonly found in open fields with short (less than 1 foot), herb-dominated ground cover, and areas of significant sparse vegetation and patches of bare ground (Marshall 2003). Streaked horned larks (*strigata* subspecies) have not been found nesting in southwest Oregon since 1976.
Townsend's big-eared bat	BS	P	P	P	• Hibernate and rear their young in sites such as caves, mines, and buildings. Rimrock, cliffs, bridges, boulder fields, and possibly bark of large trees have the potential to be used as day roosts.
Travelling sideband (mollusk)	BS	P	P	P	• May be found seeking refuge and hibernating under mosses in notches of trees and under leaf litter at the bases of bigleaf maples. They are active during the spring when temperatures are warm and soils are moist.
Tri-colored blackbird	BS	P	P	U	• Nesting colonies associated with hardstem bulrush, willows, nettles, cattail, and blackberry. Present at Denman and Sams Valley on private lands in the lower elevations along the Rogue River.
White-headed woodpecker	BS	P	V	A	• Prefers open, ponderosa-pine dominated forests.
White-tailed kite	BS	P	P	S	• Nest in trees around fields and agricultural areas and forage in uncultivated open lowlands, prairies, and coastal estuaries. White-tailed kites are present in the low elevation farm lands in the Rogue Valley.
Willow flycatcher	BCC	P	P	P	• Closely associated with shrub-dominated habitats that contain dense shrubs or tall herbaceous plants with patches of shorter vegetation. They prefer riparian areas and willow thickets in southwest Oregon. They nest in shrub-level vegetation, within a few feet of the ground.

Status:

FT - *USFWS Threatened* - likely to become endangered species within the foreseeable future

BS - *Bureau Sensitive* (BLM) - eligible for addition to Federal Notice of Review, and known in advance of official publication. Generally these species are restricted in range and have natural or human caused threats to their survival.

BCC - *Bird Species of Conservation Concern* found in Bird Conservation Region 5 (BCR 5).

GBBDC - *Game Birds Below Desired Condition*.

Presence or Absence:

P – Present	S – Suspected	V – Vagrant
A – Absent	U – Unknown	M – Migrant

3.9.3.3 Deer and Elk

Approximately 1,100 acres of proposed fuels hazard reduction units are in designated Big Game Winter Range and Elk Management Area. Additionally, the Oregon Department of Fish and Wildlife (ODFW) proposed 300 acres adjacent to project units for fuels reduction treatment to also provide improvements to big game habitat; 220 of those acres are located in Big Game Winter Range and Elk Management Area. These additional treatment areas were identified as important winter foraging areas for deer and elk by ODFW. The 300 acres consist primarily of decadent wedgeleaf ceanothus. Deer and elk prefer fresh regrowth and forbs for foraging. Medford District ROD/RMP guidelines for these areas recommend closing all roads except major collectors and arterials during the seasonal restriction (November 15 to April1) and minimizing new road construction. The BLM is required to keep existing roads open that provide access to adjacent private lands. No new road construction is proposed in this project.

3.9.3.4 Neotropical Migratory Bird Species of Conservation Concern and Game Birds below Desired Condition

BLM management direction states that NEPA analysis would occur for actions having the potential to negatively or positively affects birds identified by USFWS in *A Blueprint for the Future of Migratory Birds, Migratory Bird Program Strategic Plan 2004-2014* (USDI 2008). This publication includes a list of "Western BLM Bird Species of Conservation Concern" (Migratory Birds of Concern) and "Game Birds below Desired Condition," which were compiled from historical records and surveys. BLM biologists reviewed bird species determined to be of concern for the lands in the region where Medford District BLM is located (Bird Conservation Region 5, USGWS Region 1) and compiled the list of Migratory Birds of Concern and Game Birds below Desired Condition found in Table 3-23.

3.9.4 Environmental Consequences

3.9.4.1 Effects of Alternative 1 (No Action) on Wildlife

Under the No Action Alternative, hazardous fuels would not be reduced. The continued accumulation of brush would reduce wildlife's ability to access and use the areas proposed for treatment. Larger trees would be slower to develop due to brush competition. As the fuel load increases, the likelihood of large-scale fire would also increase and the loss of habitat for hardwood and conifer-dependent species would become more likely. Such fires would also be likely to degrade or destroy adjacent forest stands used by species such as the northern spotted owl and many Bureau Sensitive wildlife species.

3.9.4.2 Effects of Alternative 2 (Proposed Action) on Wildlife

Direct and Indirect Effects

Under Alternative 2, the BLM proposes to remove brush and small trees from the Project Area. This vegetation currently serves as habitat for some wildlife species. In the short-term, this habitat modification may reduce the suitability of these habitats for those species. Ample areas of similar habitat in close proximity to the areas to be treated would continue to provide areas for these species to persist. Treated areas would return to suitability in 3 to 5 years as shrub and brush species regenerate and reserved vegetation is allowed to grow with increased vigor. The proposed maintenance underburning would help to prevent these areas from transitioning into less productive, older, denser brush fields, which are less accessible and less useful to species like deer and elk and some Bureau Sensitive Species. Consequently, reducing the risk of high severity fire through thinning relatively small diameter trees would help increase the diameters of the remaining larger trees. See Table 3-24 for a list of T&E and Bureau Sensitive species that may benefit and may be disturbed by the proposed project.

Northern Spotted Owl

The proposed action would remove selected small diameter trees and brush to reduce hazardous fuels. A portion of the project is located in suitable (NRF) and dispersal-only habitat for the northern spotted owl. The BLM informally consulted with the US Fish and Wildlife Service on the proposed actions and a Letter of Concurrence was received (LOC # 13420-2009-1-0045). The proposed project **may affect, but is not likely to adversely affect (NLAA)**, the northern spotted owl because it would treat and maintain the current function of the habitat and would not change the way owls use the habitat. The habitat would continue to function as suitable or dispersal-only habitat for spotted owls. Existing overhead canopy would be maintained in the proposed hazardous fuels reduction units. Small diameter trees and brush that would be cut would be placed in piles and burned. An average of 10 percent of these piles would remain unburned, providing shelter for small mammals and maintaining forage opportunities for spotted owls. A slight reduction in the small mammal population is outweighed by the reduced risk of a stand-replacement fire that may entirely remove spotted owl habitat. No small mammals in the Project Area are listed as T&E or Bureau Sensitive.

Proposed hazardous fuels reduction units occur adjacent to known locations of northern spotted owls. As stipulated in the PDFs, activity in proximity to these sites will occur only during prescribed operating periods and in coordination with the BLM wildlife biologist. Treatments would not occur in suitable nesting habitat within 300 meters of any known spotted owl nest tree. The project is not located in designated critical habitat (CHU) for the northern spotted owl. Fuels hazard reduction is proposed in a designated spotted owl connectivity block. Late-successional forest within the connectivity block would be maintained. Future timber harvest activities are anticipated in the Project Area which may degrade spotted owl habitat. These projects are still in the planning stages and will be consulted on in a separate Biological Assessment.

Bureau Special Status Wildlife Species

Bureau Sensitive wildlife species that are not anticipated to be impacted directly or indirectly include the bald eagle, foothill yellow-legged frog, fringed myotis, northwestern pond turtle, pallid pat, peregrine falcon, Townsend's big-eared bat, vernal pool fairy shrimp, and white-tailed kite. These species use other habitat components than would be removed, or the Project Area is outside of their known home range.

The chace sideband snail, fisher, Oregon shoulderband snail, and Siskiyou Hesperian snail may be minimally impacted by the proposed project, but the BLM anticipates enough habitat components such as large CWD and overhead canopy would remain to provide adequate refuge to perpetuate the species. The remaining CWD, patches, and unburned piles would continue to provide refuge for the Bureau Sensitive birds and mollusks that use those components. The proposed action would not affect the persistence of these species in the Project Area. Fisher may disperse through the Project Area, but den sites have not been located and camera bait stations on the west side of the Project Area have not detected any individuals. Large diameter, live trees, components fishers require for denning, would not be removed.

Neotropical Migratory Bird Species of Conservation Concern and Game Birds below Desired Condition

The proposed project would have a minor impact on migratory birds. BLM issued interim guidance for meeting BLM's responsibilities under the Migratory Bird Treaty Act (MBTA) and Executive Order (EO) 13186. Both the MBTA and the EO promote the conservation of migratory bird populations. The interim

guidance was transmitted through Instruction Memorandum (IM) No. 2008-050. Table 3-23 displays those species on the lists that are known or likely to be present in the Project Area. Specific species that may be temporarily impacted, directly or indirectly, include the band-tailed pigeon, mourning dove, Oregon vesper sparrow, purple finch, rufous hummingbird, and willow flycatcher. All of these species use some of the habitat components that would be removed by the project, but not all of the habitat components would be removed. In addition, this type of habitat is common adjacent to the proposed project units. Small diameter trees and brush that would be cut would be placed in piles and burned. At least 10 percent of brush patches would remain uncut, an average of 10 percent of brush piles would remain unburned, and large-diameter coarse woody debris (CWD) would be maintained.

Migratory birds that would likely benefit from a more open understory include the grasshopper sparrow, Lewis' woodpecker, olive-sided flycatcher, streaked horned lark, and white-headed woodpecker. These bird species prefer more open stands for foraging, nesting, or both. See Table 3-23 for nesting and foraging habitat preferences for these species. Directly or indirectly, these species are not expected to be negatively impacted by the proposed project.

Deer and Elk

Opening the understory and clearing brush in the Project Area would likely improve foraging for deer and elk in 1 to 2 years following the treatments. Fresh regrowth of wedgeleaf ceanothus and forbs would provide valuable winter forage in areas where deer and elk are known to congregate during winter months. Approximately 1,300 acres of deer and elk winter range that would be opened would improve foraging opportunities. Additionally, an ODFW biologist identified approximately 80 acres of wedgeleaf ceanothus outside of the designated winter range that is important for winter foraging. These acres would also be thinned to encourage fresh growth preferred by deer and elk.

Table 3-24. Affects to Deer and Elk and Bureau Special Status Wildlife Species from Proposed Understory Thinning

Species Benefited	Species Disturbed	Species Minimally Disturbed	Species Not Affected
Black-tailed Deer	Band-tailed Pigeon	Northern Spotted Owl	Bald Eagle
Grasshopper Sparrow	Mourning Dove	Chace Sideband	Foothill Yellow-legged Frog
Lewis' Woodpecker	Oregon Vesper Sparrow	Fisher	Fringed Myotis
Olive-sided Flycatcher	Purple Finch	Oregon Shoulderband	Northwestern Pond Turtle
Roosevelt Elk	Rufous Hummingbird	Siskiyou Hesperian	Pallid Bat
Streaked Horned Lark	Travelling Sideband		Peregrine Falcon
White-headed Woodpecker	Willow Flycatcher		Townsend's Big-eared Bat
			Vernal Pool Fairy Shrimp
			White-tailed Kite

4.0 PUBLIC PARTICIPATION

Public notice of the availability of this EA was published in the *Medford Mail Tribune* and provided through BLM's Medford District website. The BLM also mailed 73 letters to adjacent landowners; interested individuals; and the following agencies, organizations, and tribes providing notification of the EA availability.

Organizations and Agencies

Cow Creek Band of Umpqua Tribe

Klamath Siskiyou Wildlands Center

Oregon Department of State Lands

Oregon State University Library

Plum Creek Timber

Southern Oregon University Library

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Project Maps

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Map 3. Butte Falls Highway
Map 4. Cardwell Creek
Map 5. Evans Creek
Map 6. Evans Creek East
Map 7. Evans South
Map 8. Fielder Creek
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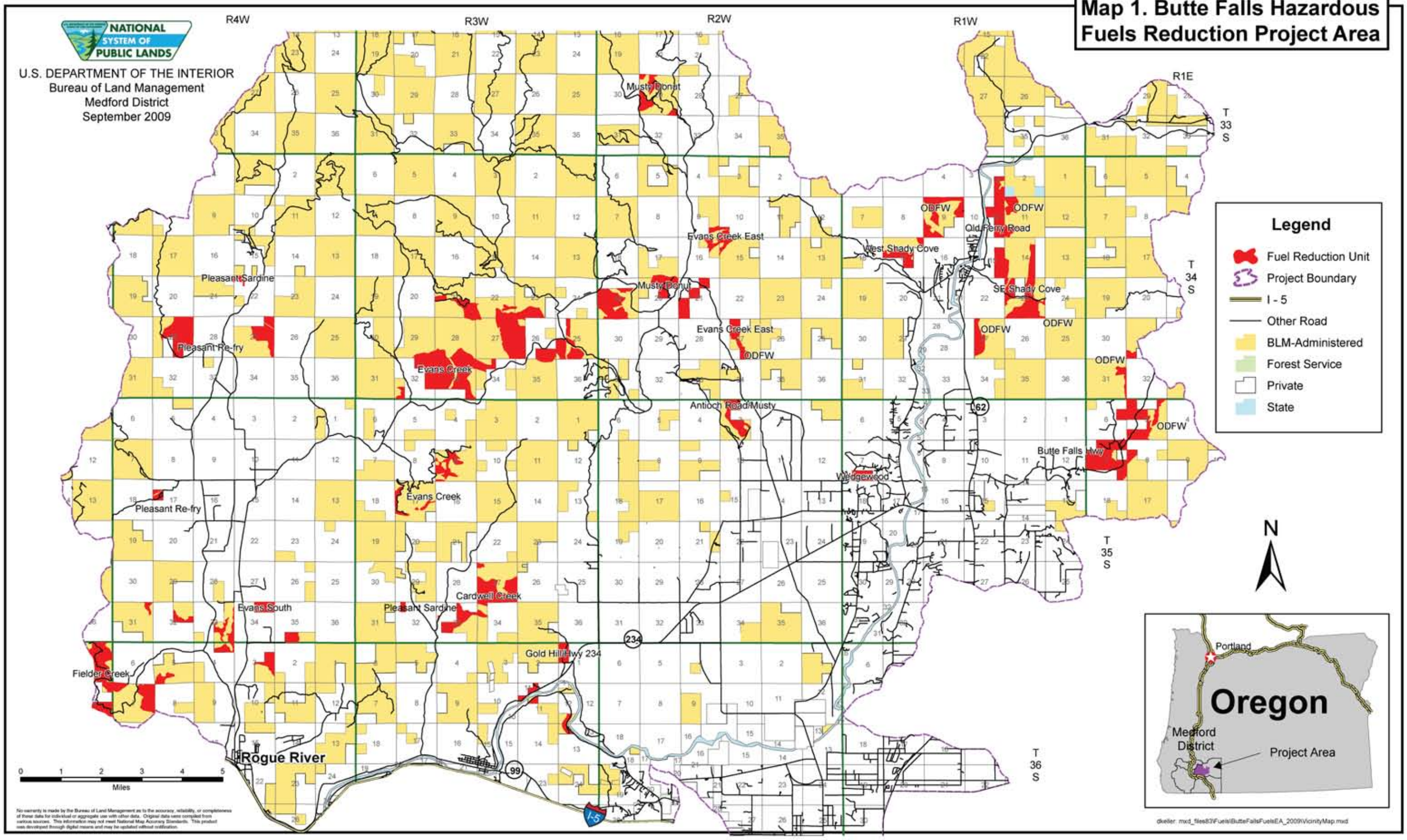
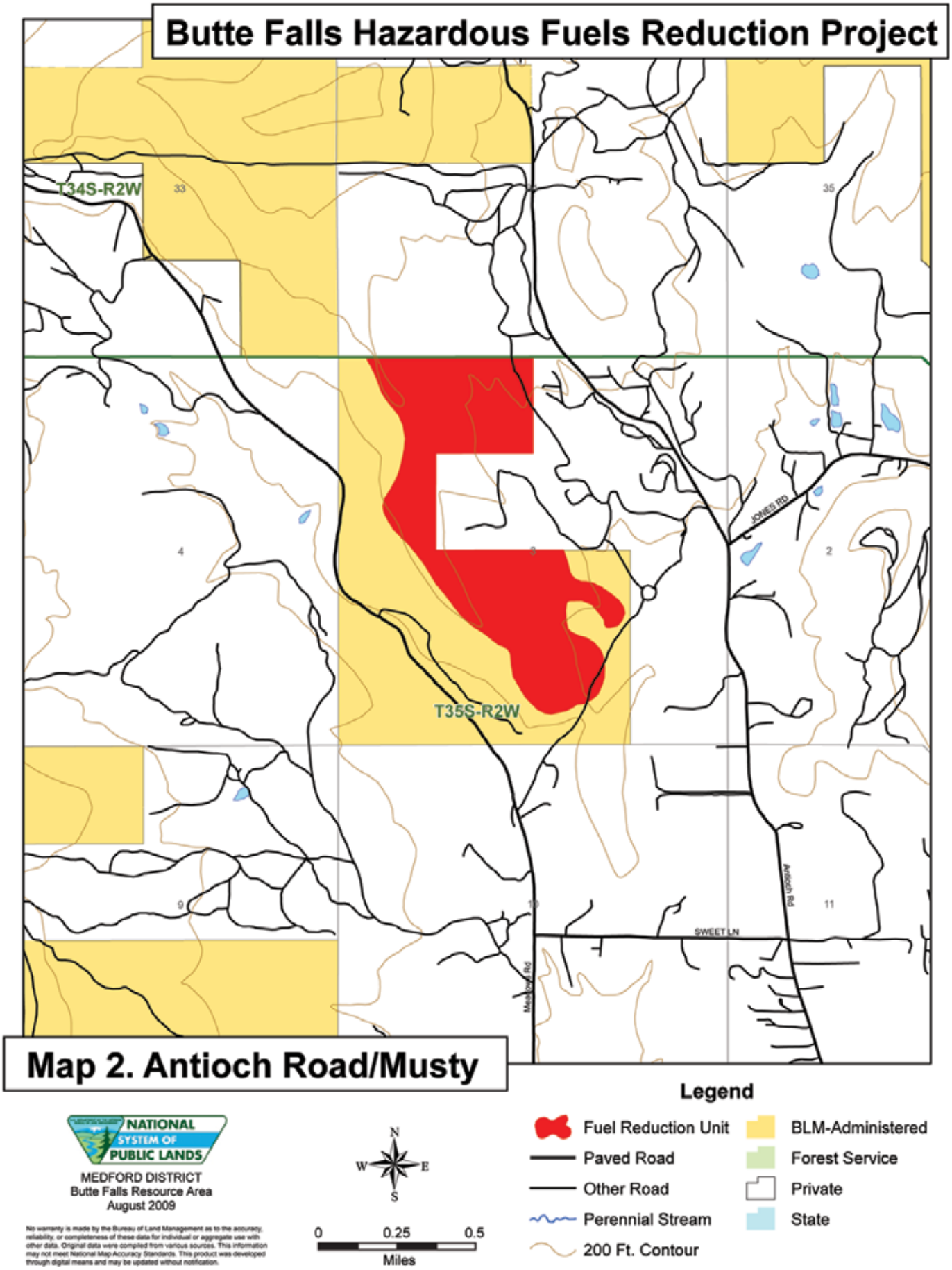
Map 11. ODFW
Map 12. Old Ferry
Map 13. Pleasant Re-fry
Map 14. Pleasant Sardine (Private)
Map 15. SE Shady Cove
Map 16. Wedgewood
Map 17. West Shady Cove

Map 1. Butte Falls Hazardous Fuels Reduction Project Area




Butte Falls Hazardous Fuels Reduction Project
T34S-R2W
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T35S-R2W
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Antioch Rd
SWEET LN
Meadow Rd
Map 2. Antioch Road/Musty
Legend
Fuel Reduction Unit
Paved Road
Other Road
Perennial Stream
200 Ft. Contour
BLM-Administered
Forest Service
Private
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Butte Falls Resource Area
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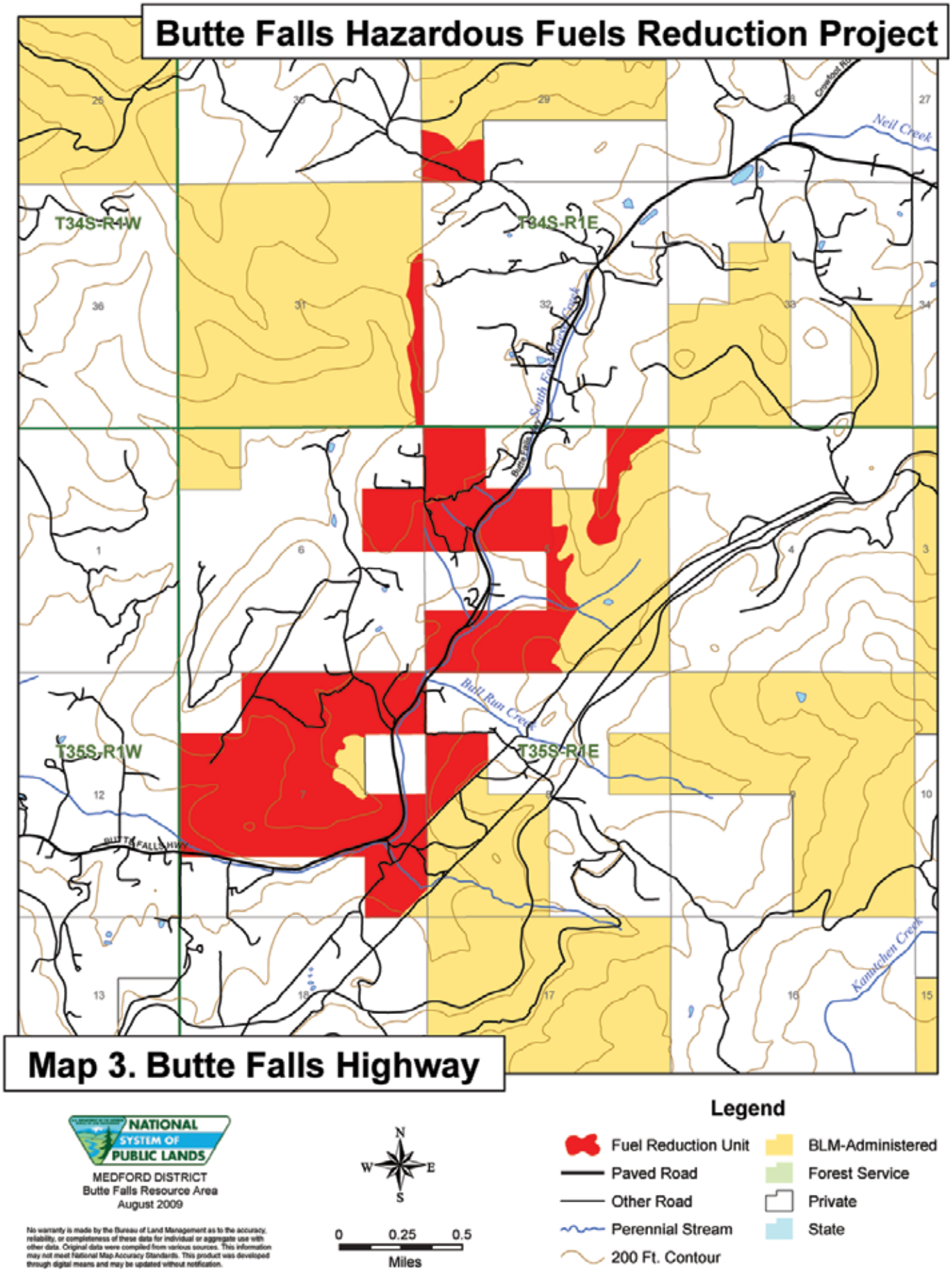
Butte Falls Hazardous Fuels Reduction Project
T34S-R4W
T34S-R1E
T35S-R1W
T35S-R1E
Neil Creek
Ball Run Creek
Kamtchen Creek
BUTTE FALLS HWY
Map 3. Butte Falls Highway
NATIONAL SYSTEM OF PUBLIC LANDS
MEDFORD DISTRICT
Butte Falls Resource Area
August 2009
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.
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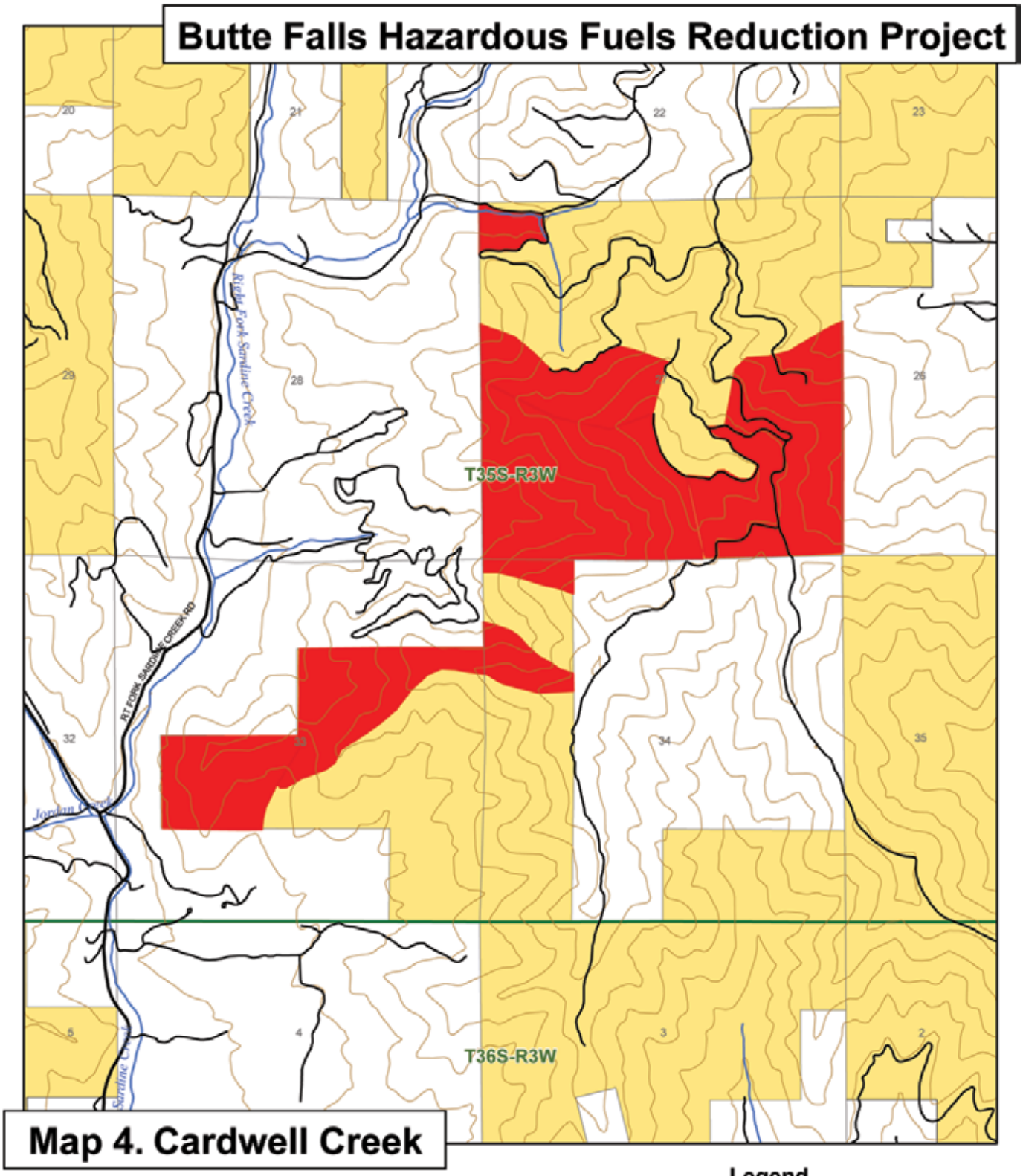

Map 4. Cardwell Creek

NATIONAL SYSTEM OF PUBLIC LANDS

MEDFORD DISTRICT
Butte Falls Resource Area
August 2009

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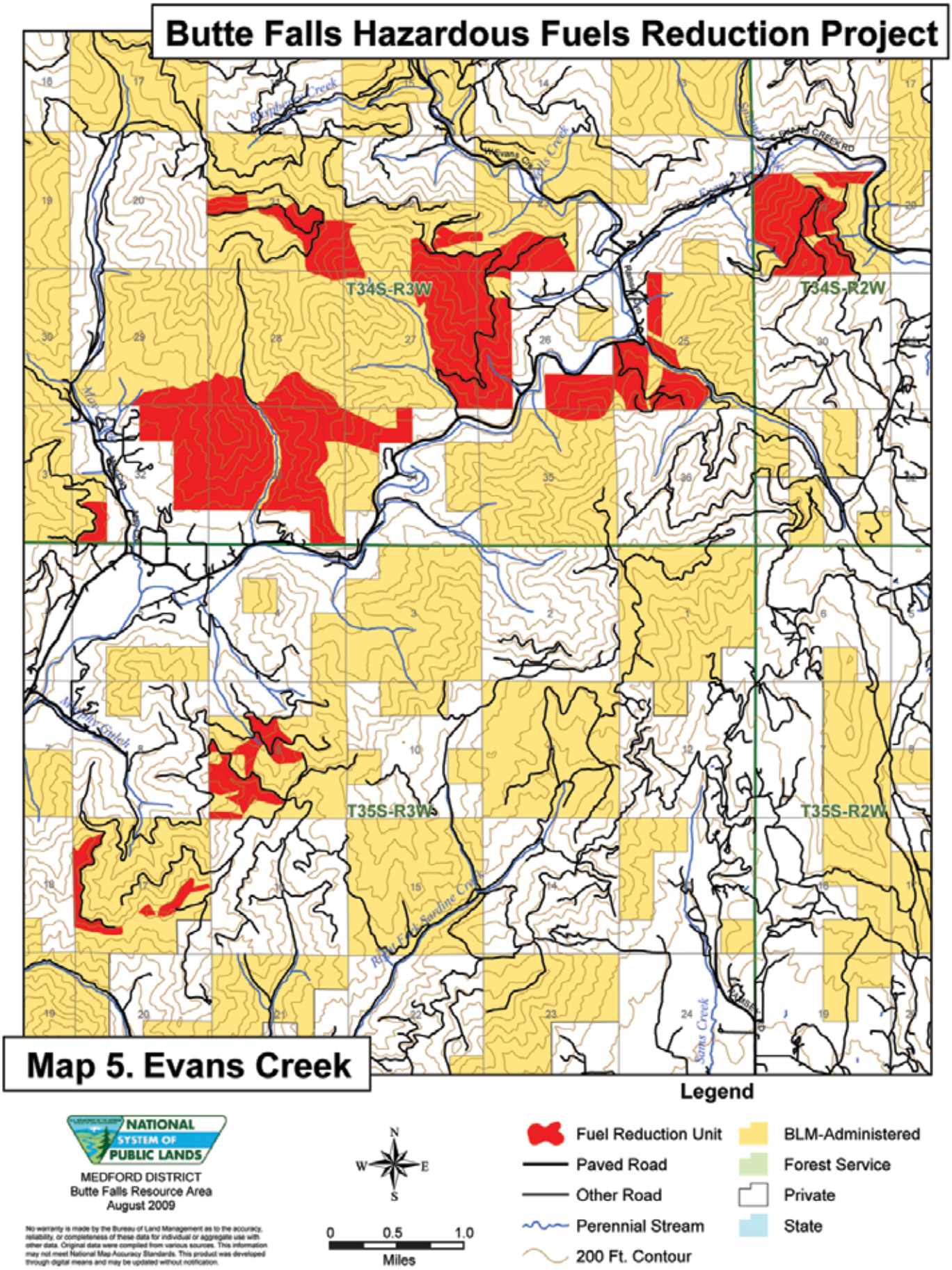
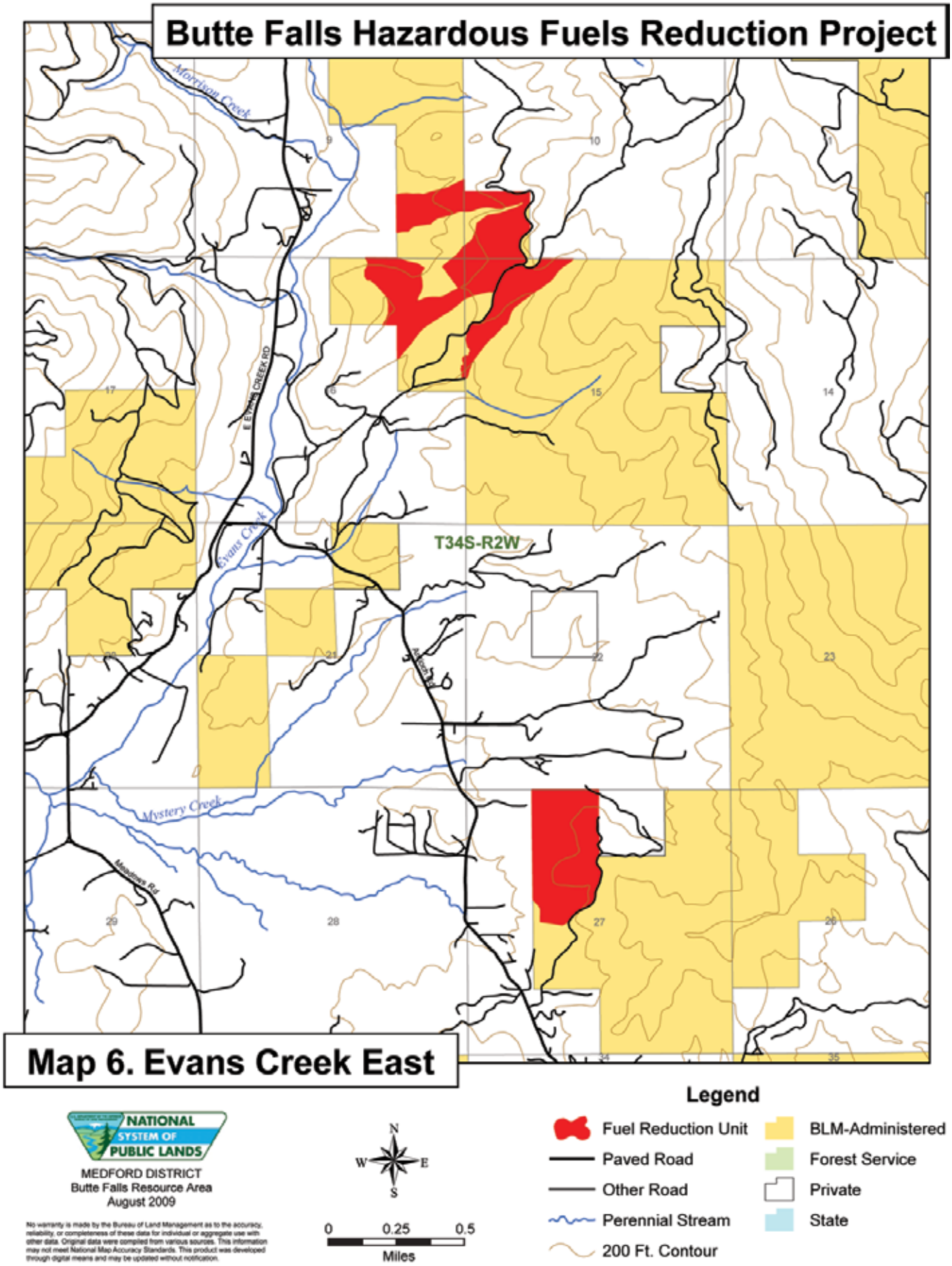


Map 5. Evans Creek



Map 6. Evans Creek East

NATIONAL SYSTEM OF PUBLIC LANDS

MEDFORD DISTRICT
Butte Falls Resource Area
August 2009

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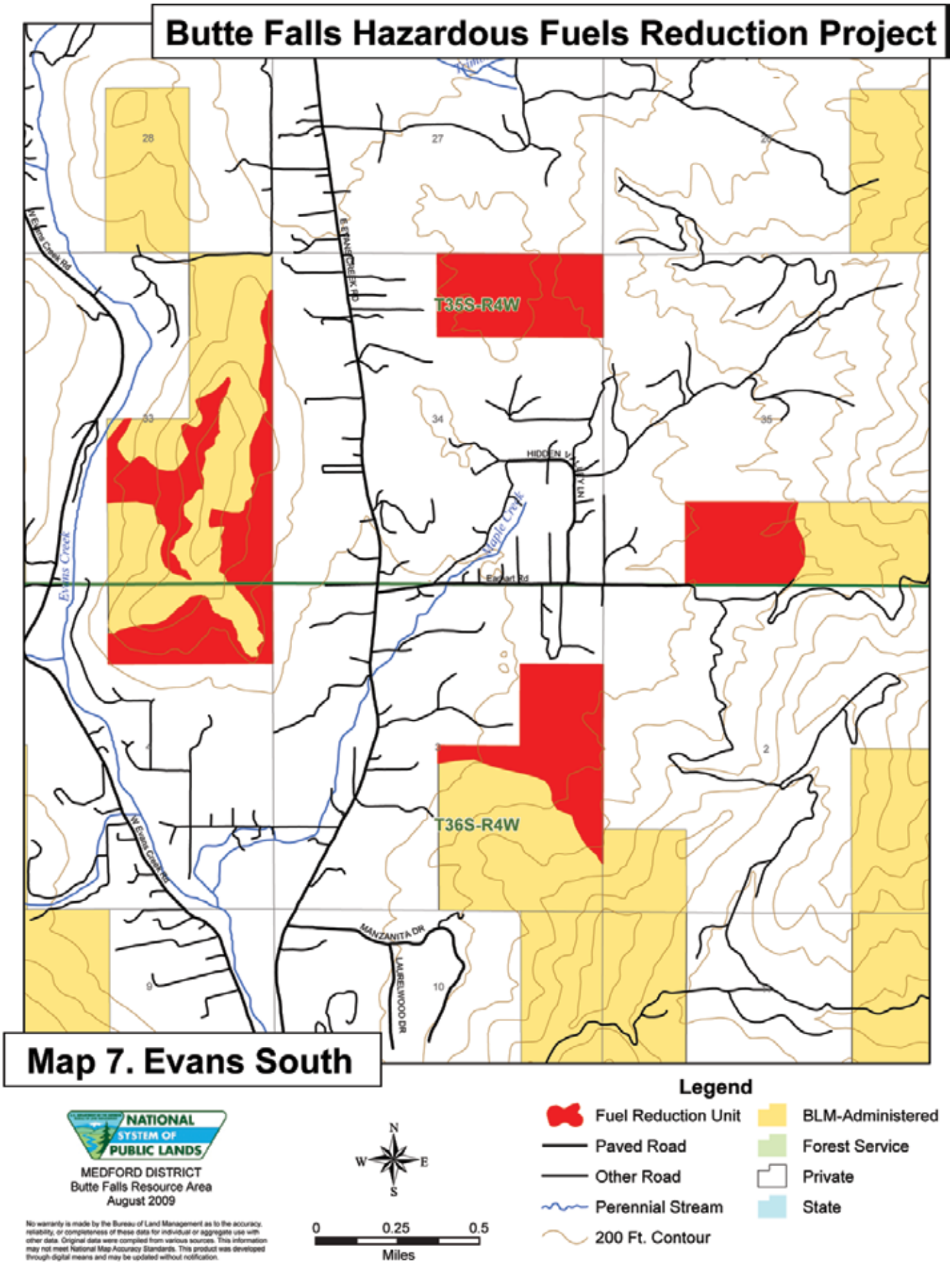
Butte Falls Hazardous Fuels Reduction Project
T35S-R4W
T36S-R4W
Evans Creek
Maple Creek
Evans Creek Rd
W Evans Creek Rd
E Evans Creek Rd
Hidden Valley Ln
Elephant Rd
Manzanita Dr
Laurelwood Dr
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Map 7. Evans South
NATIONAL SYSTEM OF PUBLIC LANDS
MEDFORD DISTRICT
Butte Falls Resource Area
August 2009
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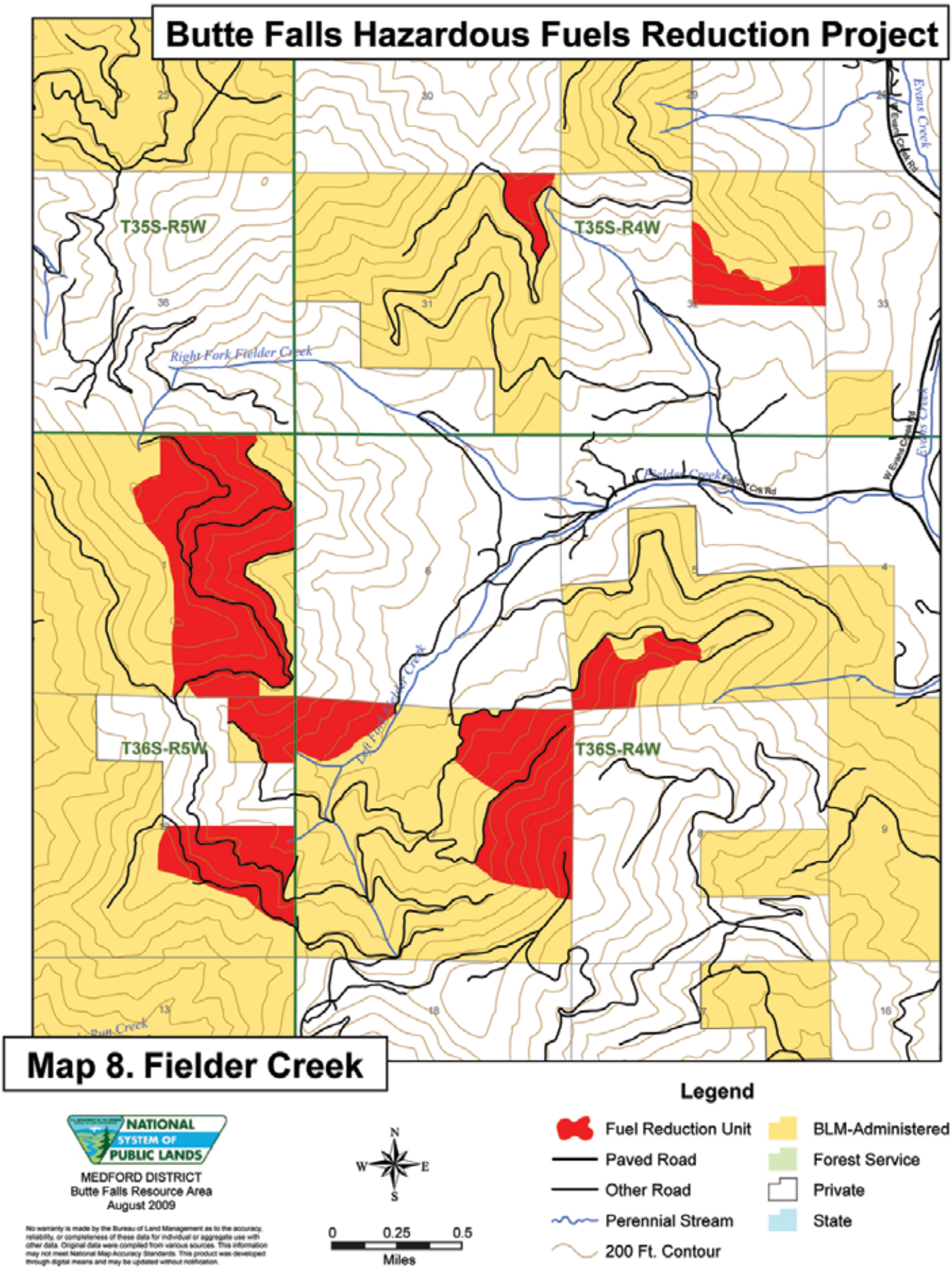
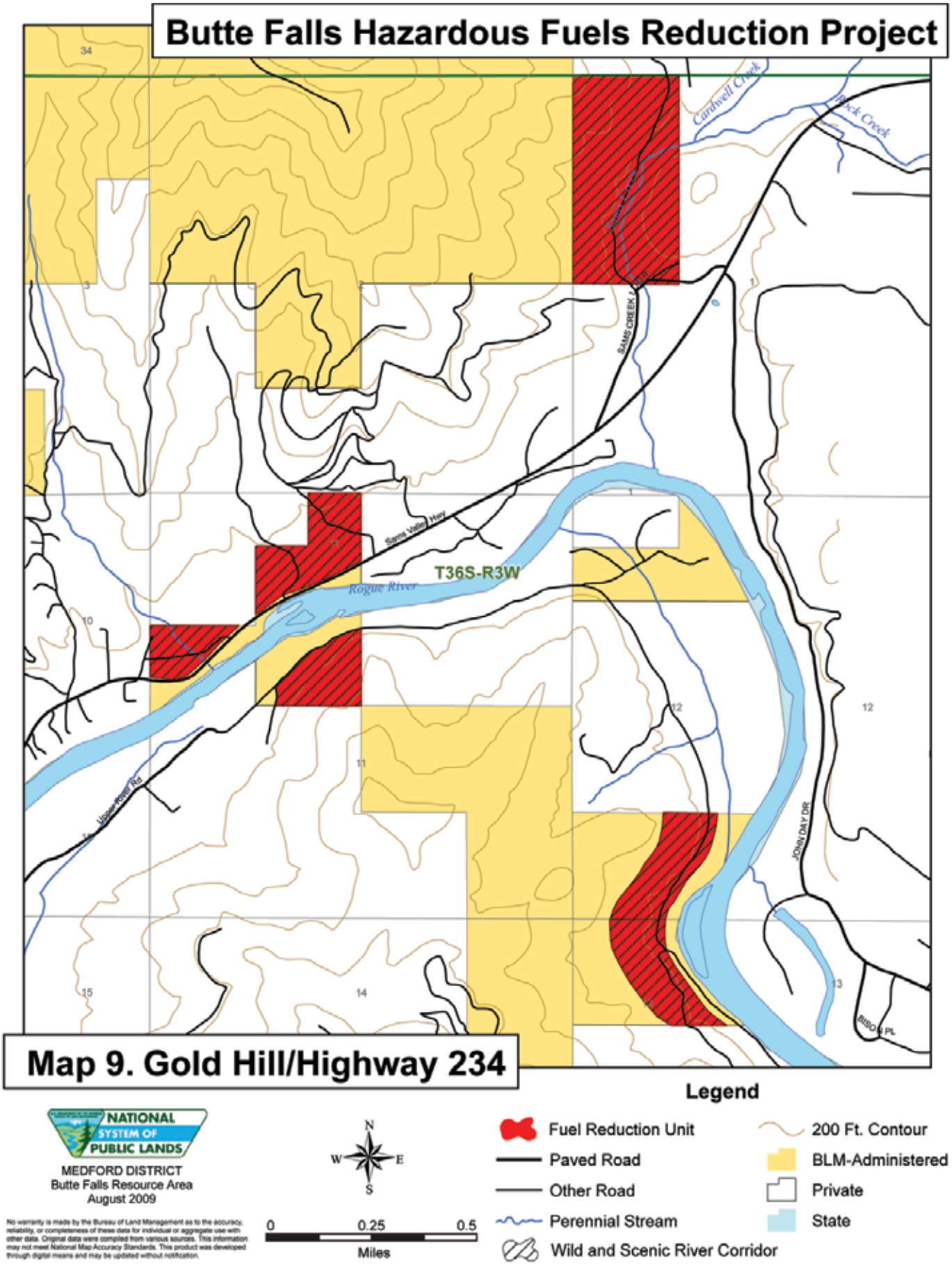


Map 8. Fielder Creek


Butte Falls Hazardous Fuels Reduction Project
Cardwell Creek
Rogue River
T36S-R3W
Sams Valley Hwy
Upper River Rd
JOHN DALY DR
BISON PL
Map 9. Gold Hill/Highway 234
Legend
Fuel Reduction Unit
Paved Road
Other Road
Perennial Stream
Wild and Scenic River Corridor
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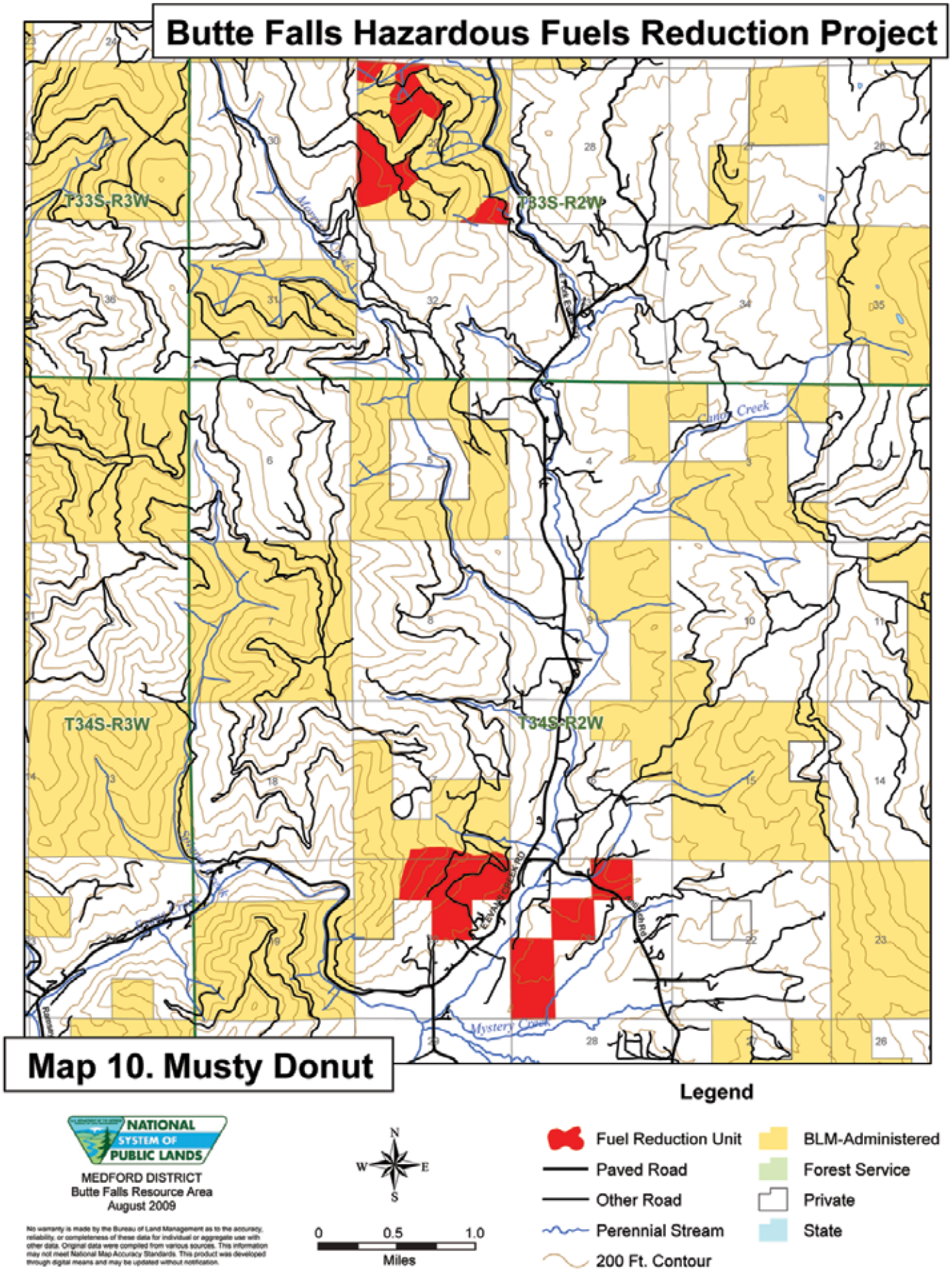
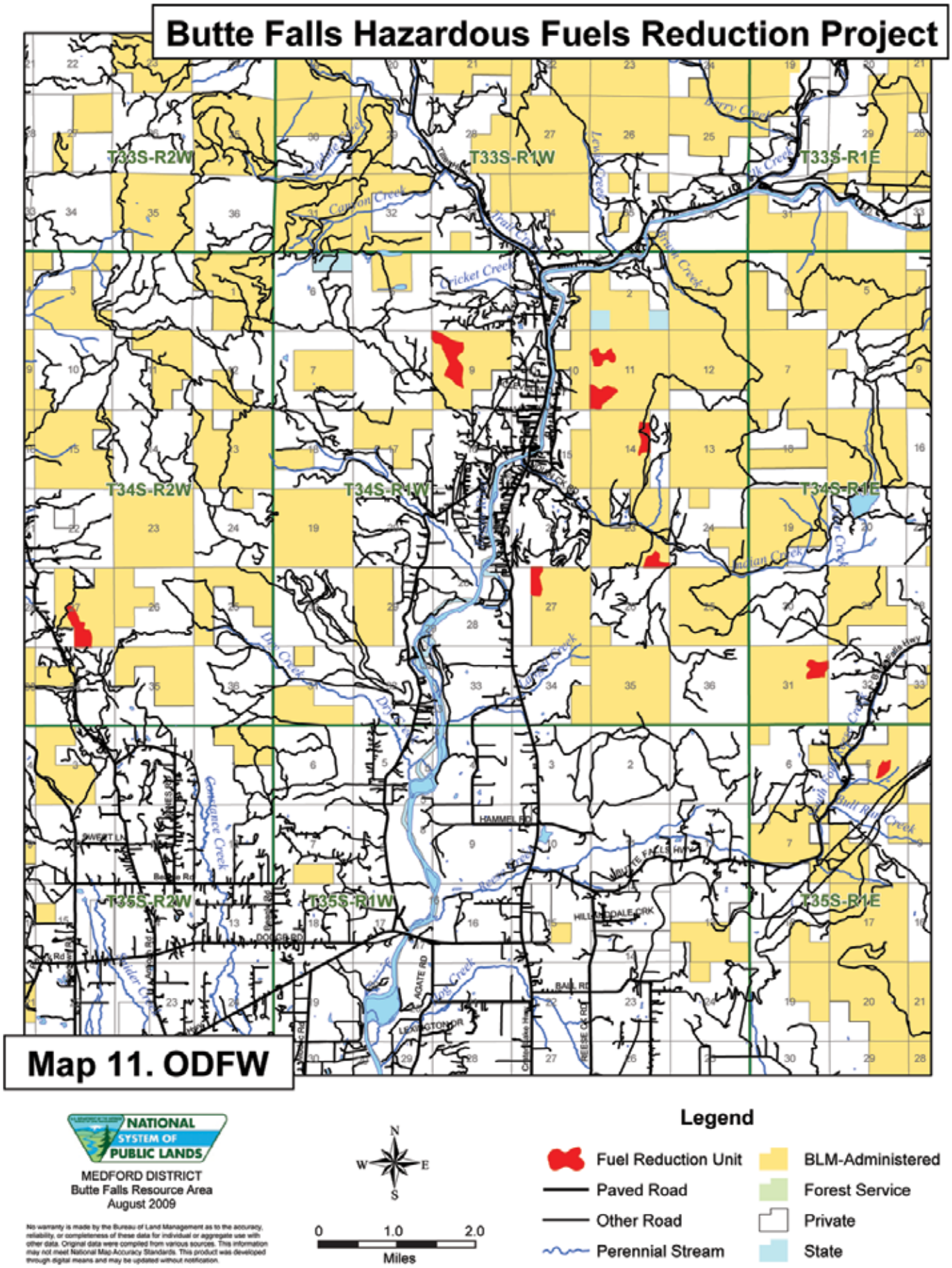


Map 10. Musty Donut


Butte Falls Hazardous Fuels Reduction Project
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T34S-R1W
T34S-R1E
T35S-R2W
T35S-R1W
T35S-R1E
Cricket Creek
Cougar Creek
Dry Creek
Bull Run Creek
Map 11. ODFW
NATIONAL SYSTEM OF PUBLIC LANDS
MEDFORD DISTRICT
Butte Falls Resource Area
August 2009
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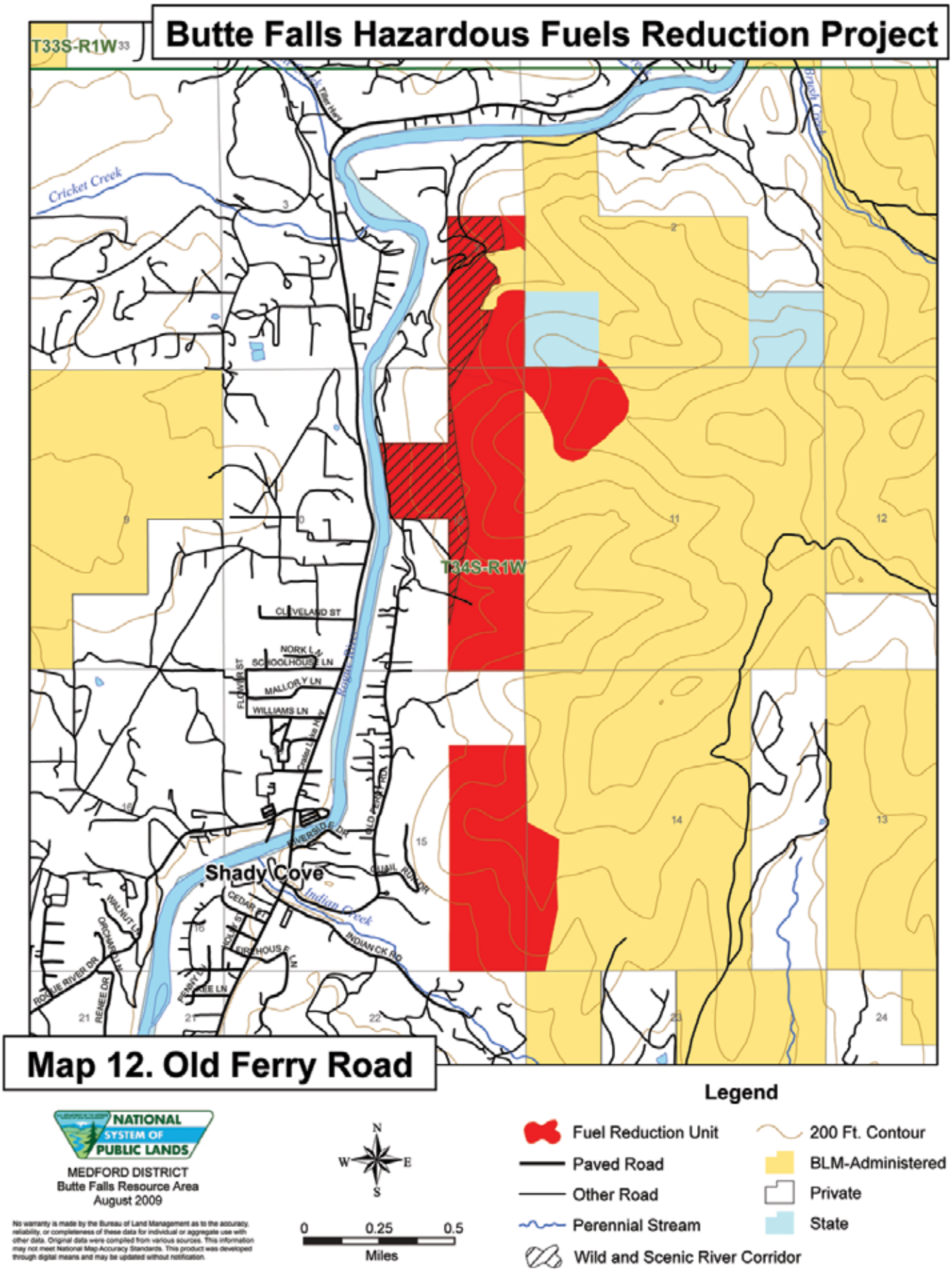
Butte Falls Hazardous Fuels Reduction Project
T33S-R1W
Cricket Creek
T34S-R1W
CLEVELAND ST
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SCHOOLHOUSE LN
MALLORY LN
WILLIAMS LN
FLOWER ST
Rogue River
Shady Cove
Indian Creek
INDIAN CK RD
CEDAR ST
FIREHOUSE LN
WALNUT LN
ORCHARD LN
ROGUE RIVER DR
REINEE DR
PENNY LN
REINEE LN
OLD FERRY RD
RIVERSIDE DR
CANAL RD
Branch Creek
Map 12. Old Ferry Road
Legend
Fuel Reduction Unit
Paved Road
Other Road
Perennial Stream
Wild and Scenic River Corridor
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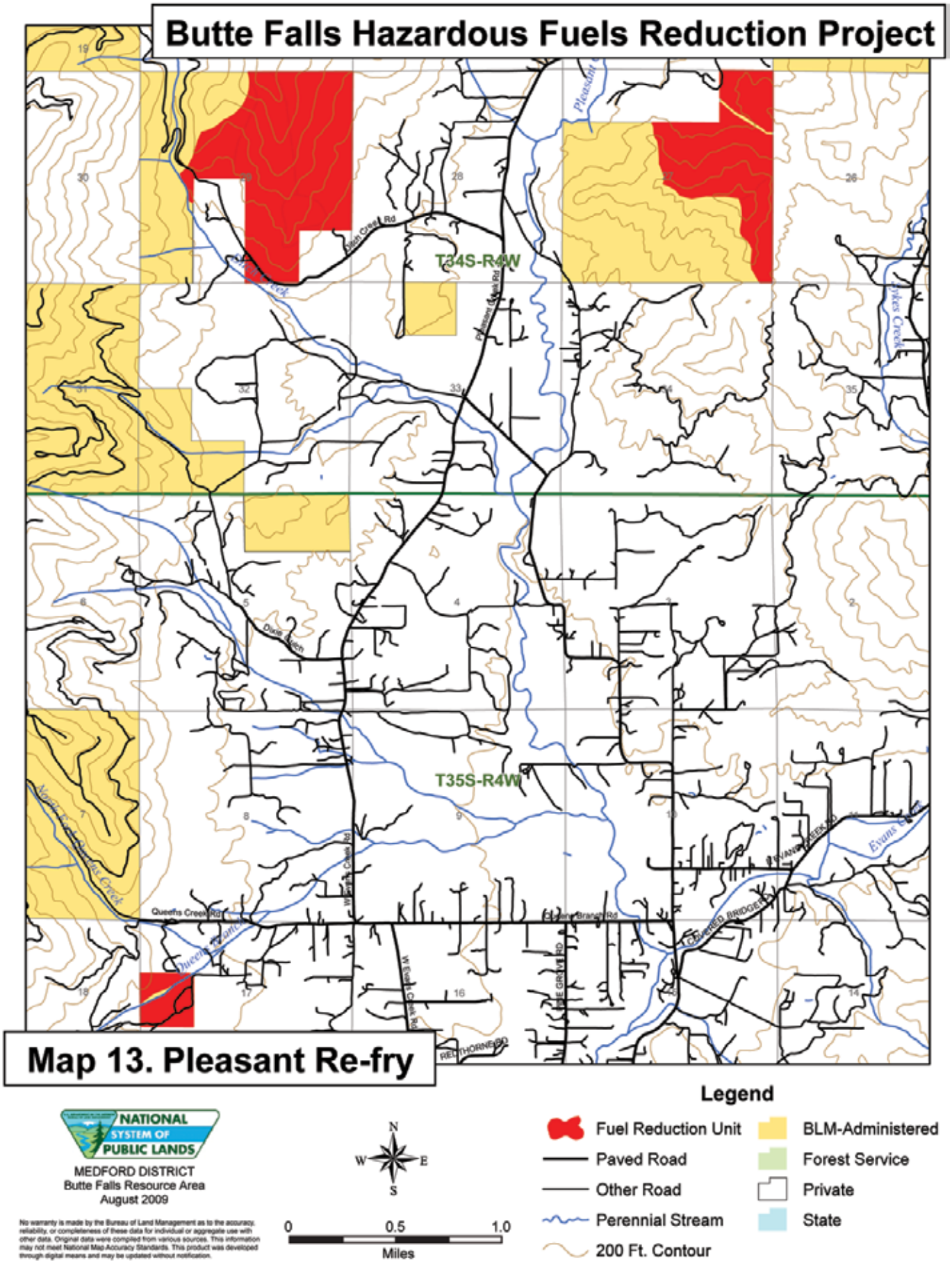
Butte Falls Hazardous Fuels Reduction Project
T34S-R4W
T35S-R4W
Pleasant Creek Rd
Pleasant Creek Rd
Dixie Creek
Queefns Creek Rd
Pleasant Branch Rd
W Evans Creek Rd
W Evans Creek Rd
COVERED BRIDGE RD
Evans Creek
Pleasant Creek
Dixie Creek
Bykes Creek
Map 13. Pleasant Re-fry
Legend
Fuel Reduction Unit
Paved Road
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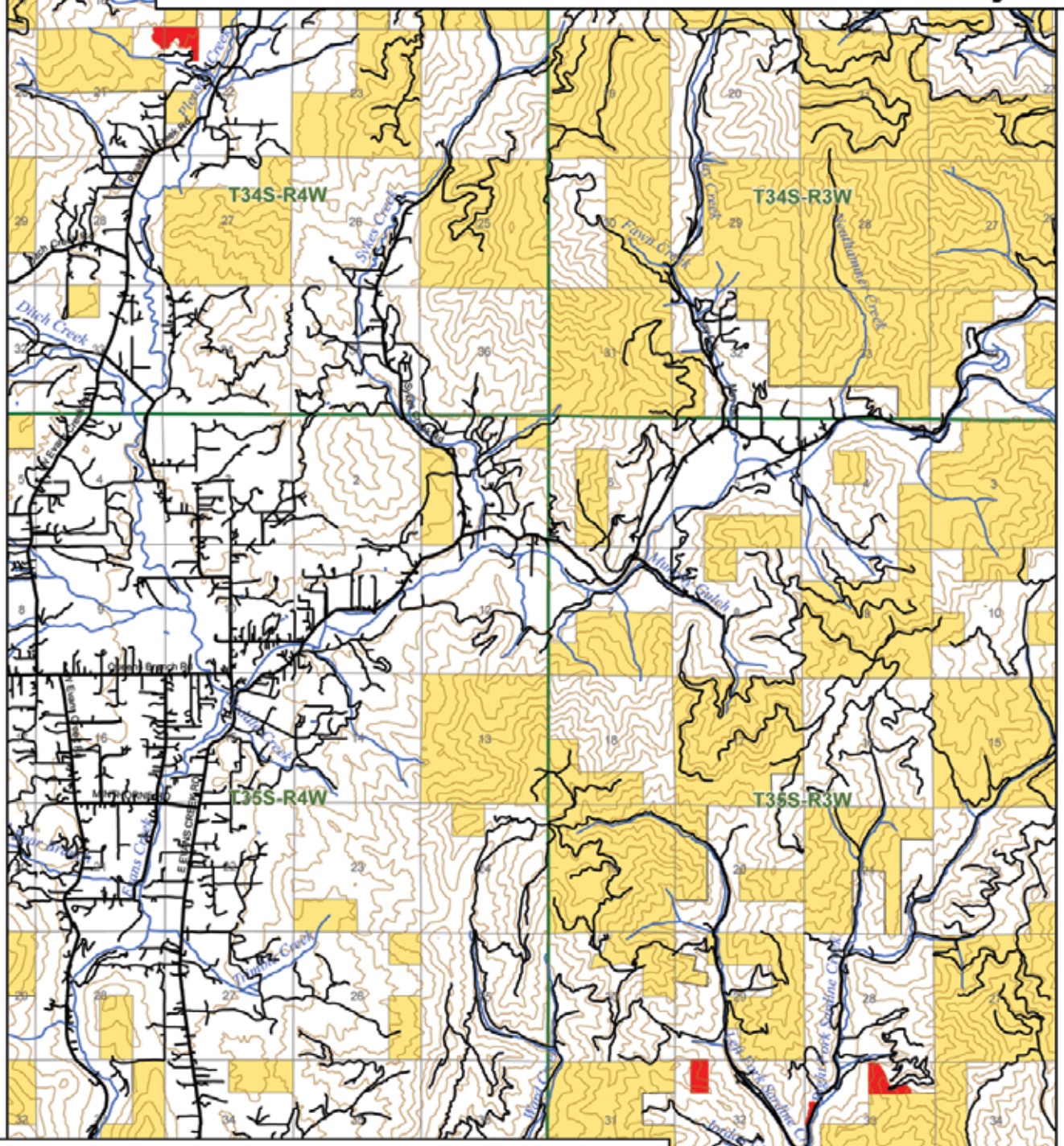
Butte Falls Hazardous Fuels Reduction Project



Map 14. Pleasant Sardine (Private)

NATIONAL SYSTEM OF PUBLIC LANDS

MEDFORD DISTRICT
Butte Falls Resource Area
August 2009

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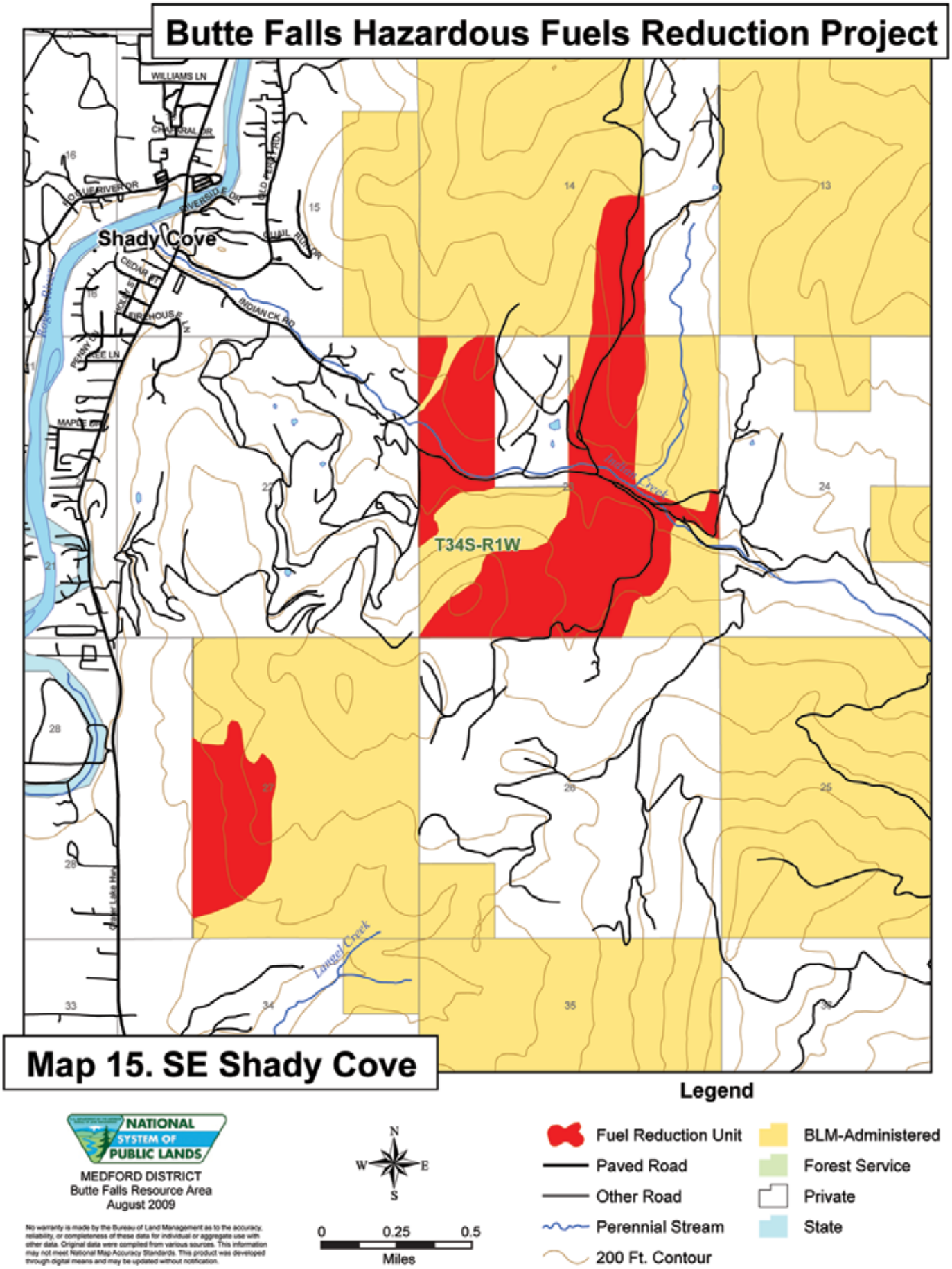
Butte Falls Hazardous Fuels Reduction Project
WILLIAMS LN
Shady Cove
INDIANCK RD
T34S-R1W
Indian Creek
Langel Creek
Map 15. SE Shady Cove
Legend
Fuel Reduction Unit
Paved Road
Other Road
Perennial Stream
200 Ft. Contour
BLM-Administered
Forest Service
Private
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NATIONAL SYSTEM OF PUBLIC LANDS
MEDFORD DISTRICT
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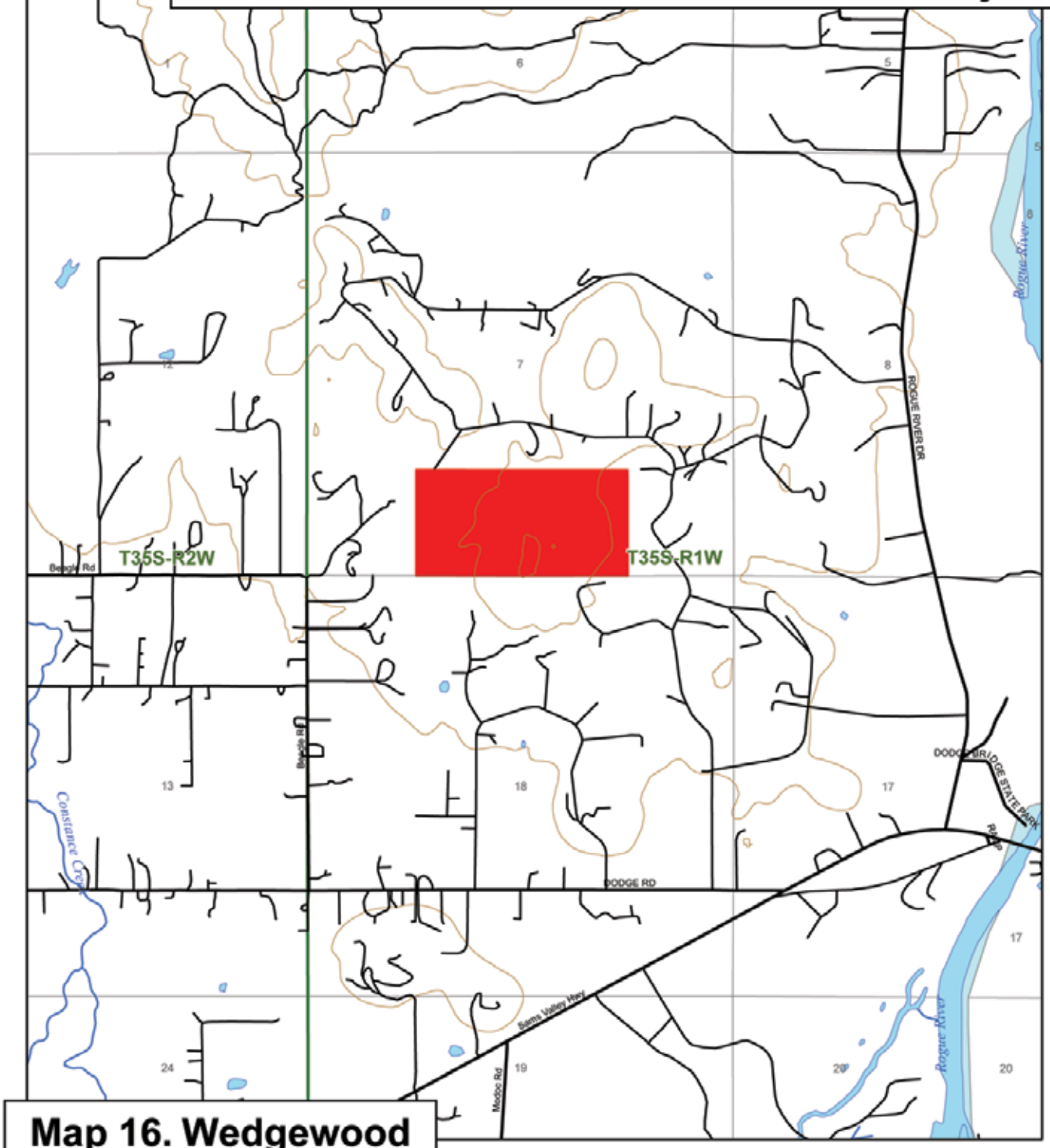
Miles

Butte Falls Hazardous Fuels Reduction Project



Map 16. Wedgewood

NATIONAL SYSTEM OF PUBLIC LANDS

MEDFORD DISTRICT
Butte Falls Resource Area
August 2009

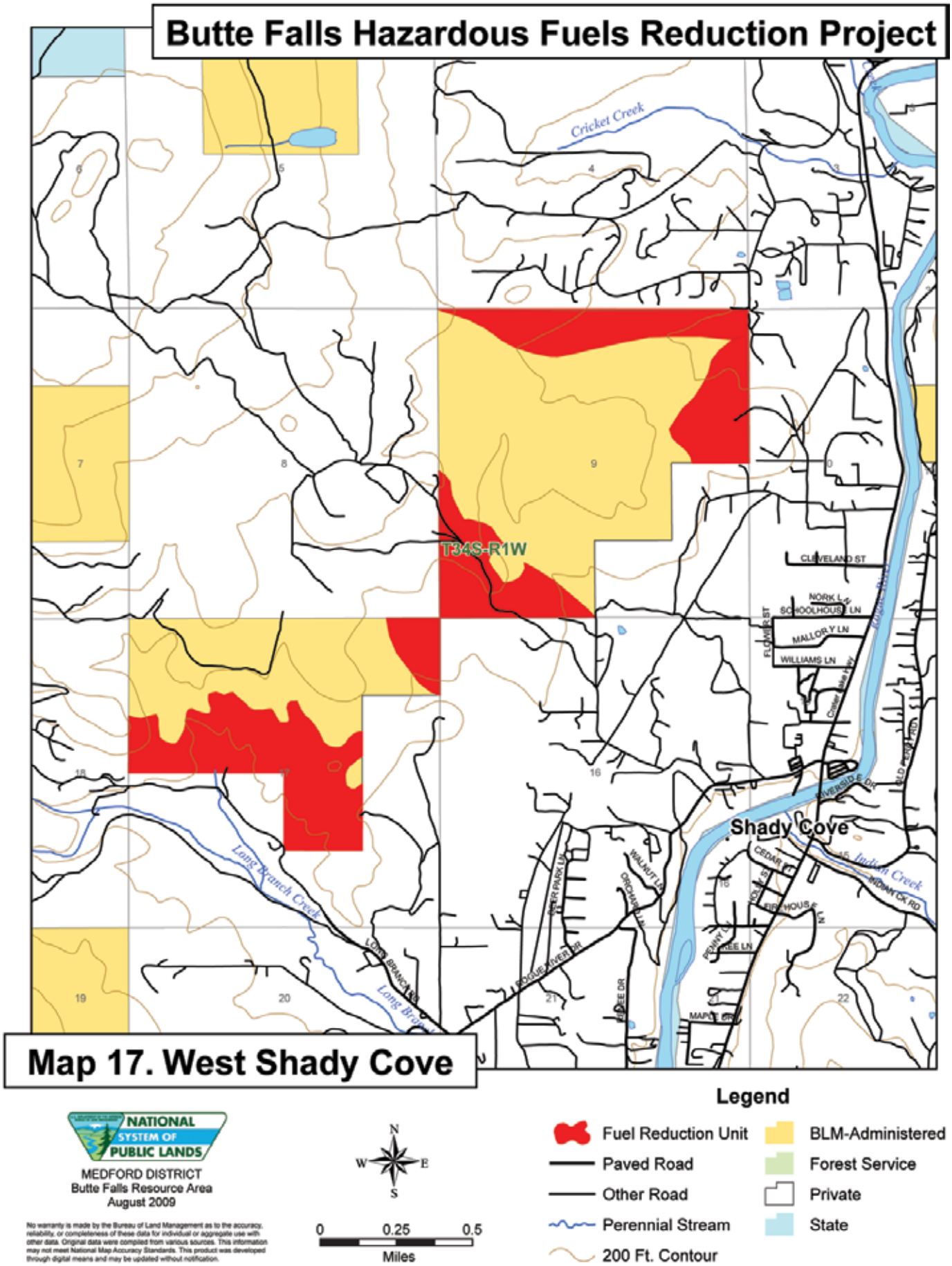
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed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

N
W E
S

0 0.25 0.5
Miles

Legend

- Fuel Reduction Unit
- Paved Road
- Other Road
- Perennial Stream
- 200 Ft. Contour
- BLM-Administered
- Forest Service
- Private
- State



Map 17. West Shady Cove

NATIONAL SYSTEM OF PUBLIC LANDS

MEDFORD DISTRICT
Butte Falls Resource Area
August 2009

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N
W E
S

0 0.25 0.5
Miles

Legend

- Fuel Reduction Unit
- Paved Road
- Other Road
- Perennial Stream
- 200 Ft. Contour
- BLM-Administered
- Forest Service
- Private
- State

Appendix A – Fire and Fuels

Table A-1. Proposed Hazardous Fuels Reduction Prescriptions for the Butte Falls Hazardous Fuels Reduction Project

Unit Number	Prescription	Acres	Legal Description
Antioch Road/Musty			
3-1	Thin/Hand Pile/Hand Pile Burn/Underburn	151	T35S, R2W, Sec. 3
Butte Falls Highway			
5-1	Thin/Hand Pile/Hand Pile Burn/Underburn/Broadcast Burn	126	T35S, R1E, Sec. 5
5-2	Thin/Hand Pile/Hand Pile Burn/Underburn/Broadcast Burn	106	T35S, R1E, Sec. 5
5-3	Thin/Hand Pile/Hand Pile Burn/Underburn/Broadcast Burn	33	T35S, R1E, Sec. 5
6-1	Thin/Hand Pile/Hand Pile Burn/Underburn/Broadcast Burn	40	T35S, R1E, Sec. 6
7-1	Thin/Hand Pile/Hand Pile Burn/Underburn/Broadcast Burn	425	T35S, R1E, Sec. 7
8-1	Thin/Hand Pile/Hand Pile Burn/Underburn/Broadcast Burn	38	T35S, R1E, Sec. 8
29-1	Thin/Hand Pile/Hand Pile Burn/Underburn/Broadcast Burn	28	T34S, R1E, Sec. 29
31-1	Thin/Hand Pile/Hand Pile Burn/Underburn/Broadcast Burn	20	T34S, R1E, Sec. 31
Cardwell Creek			
27-1	Thin/Hand Pile/Hand Pile Burn/Underburn	12	T35S, R3W, Sec. 27
27-2	Thin/Hand Pile/Hand Pile Burn/Underburn	52	T35S, R3W, Sec. 27
27-3	Thin/Hand Pile/Hand Pile Burn/Underburn	151	T35S, R3W, Sec. 27
27-4	Thin/Hand Pile/Hand Pile Burn/Underburn	126	T35S, R3W, Sec. 27
33-1	Thin/Hand Pile/Hand Pile Burn/Underburn	80	T35S, R3W, Sec. 33
33-2	Thin/Hand Pile/Hand Pile Burn/Underburn	53	T35S, R3W, Sec. 33, 34
Evans Creek			
171	Thin/Hand Pile/Hand Pile Burn/Underburn	46	T35S, R3W, Sec. 17
172	Thin/Hand Pile/Hand Pile Burn/Underburn	3	T35S, R3W, Sec. 17
173	Thin/Hand Pile/Hand Pile Burn/Underburn	16	T35S, R3W, Sec. 17
191	Thin/Hand Pile/Hand Pile Burn/Underburn	123	T34S, R2W, Sec. 19
192	Thin/Hand Pile/Hand Pile Burn/Underburn	17	T34S, R2W, Sec. 19
193	Thin/Hand Pile/Hand Pile Burn/Underburn	38	T34S, R2W, Sec. 19
194	Thin/Hand Pile/Hand Pile Burn/Underburn	29	T34S, R2W, Sec. 19
195	Thin/Hand Pile/Hand Pile Burn/Underburn	13	T34S, R2W, Sec. 19
196	Thin/Hand Pile/Hand Pile Burn/Underburn	27	T34S, R2W, Sec. 19
197	Thin/Hand Pile/Hand Pile Burn/Underburn	19	T34S, R2W, Sec. 19
198	Thin/Hand Pile/Hand Pile Burn/Underburn	9	T34S, R2W, Sec. 19
211	Thin/Hand Pile/Hand Pile Burn/Underburn	84	T34S, R3W, Sec. 21
212	Thin/Hand Pile/Hand Pile Burn/Underburn	25	T34S, R3W, Sec. 21
213	Thin/Hand Pile/Hand Pile Burn/Underburn	22	T34S, R3W, Sec. 21
214	Thin/Hand Pile/Hand Pile Burn/Underburn	23	T34S, R3W, Sec. 21
221	Thin/Hand Pile/Hand Pile Burn/Underburn	24	T34S, R3W, Sec. 22
222	Thin/Hand Pile/Hand Pile Burn/Underburn	19	T34S, R3W, Sec. 22
231	Thin/Hand Pile/Hand Pile Burn/Underburn	34	T34S, R3W, Sec. 23
232	Thin/Hand Pile/Hand Pile Burn/Underburn	50	T34S, R3W, Sec. 23
251	Thin/Hand Pile/Hand Pile Burn/Underburn	27	T34S, R3W, Sec. 25

Table A-1. Proposed Hazardous Fuels Reduction Prescriptions for the Butte Falls Hazardous Fuels Reduction Project

Unit Number	Prescription	Acres	Legal Description
252	Thin/Hand Pile/Hand Pile Burn/Underburn	16	T34S, R3W, Sec. 25
253	Thin/Hand Pile/Hand Pile Burn/Underburn	31	T34S, R3W, Sec. 25
254	Thin/Hand Pile/Hand Pile Burn/Underburn	40	T34S, R3W, Sec. 25
255	Thin/Hand Pile/Hand Pile Burn/Underburn	42	T34S, R3W, Sec. 25
256	Thin/Hand Pile/Hand Pile Burn/Underburn	16	T34S, R3W, Sec. 25
261	Thin/Hand Pile/Hand Pile Burn/Underburn	96	T34S, R3W, Sec. 26
262	Thin/Hand Pile/Hand Pile Burn/Underburn	67	T34S, R3W, Sec. 26
263	Thin/Hand Pile/Hand Pile Burn/Underburn	54	T34S, R3W, Sec. 26
264	Thin/Hand Pile/Hand Pile Burn/Underburn	32	T34S, R3W, Sec. 26
265	Thin/Hand Pile/Hand Pile Burn/Underburn	17	T34S, R3W, Sec. 26
266	Thin/Hand Pile/Hand Pile Burn/Underburn	6	T34S R3W Sec. 26
267	Thin/Hand Pile/Hand Pile Burn/Underburn	5	T34S, R3W, Sec. 26, 35
271	Thin/Hand Pile/Hand Pile Burn/Underburn	188	T34S, R3W, Sec. 27
272	Thin/Hand Pile/Hand Pile Burn/Underburn	29	T34S, R3W, Sec. 27
281	Thin/Hand Pile/Hand Pile Burn/Underburn	34	T34S, R3W, Sec. 28
291	Thin/Hand Pile/Hand Pile Burn/Underburn	42	T34S, R3W, Sec. 29
321	Thin/Hand Pile/Hand Pile Burn/Underburn	166	T34S, R3W, Sec. 32
322	Thin/Hand Pile/Hand Pile Burn/Underburn	26	T34S, R3W, Sec. 32
331	Thin/Hand Pile/Hand Pile Burn/Underburn	132	T34S, R3W, Sec. 33
332	Thin/Hand Pile/Hand Pile Burn/Underburn	68	T34S, R3W, Sec. 33
333	Thin/Hand Pile/Hand Pile Burn/Underburn	67	T34S, R3W, Sec. 33
334	Thin/Hand Pile/Hand Pile Burn/Underburn	207	T34S, R3W, Sec. 33
341	Thin/Hand Pile/Hand Pile Burn/Underburn	53	T34S, R3W, Sec. 34
342	Thin/Hand Pile/Hand Pile Burn/Underburn	26	T34S, R3W, Sec. 34
900	Thin/Hand Pile/Hand Pile Burn/Underburn	6	T35S, R3W, Sec. 9
901	Thin/Hand Pile/Hand Pile Burn/Underburn	33	T35S, R3W, Sec. 9
902	Thin/Hand Pile/Hand Pile Burn/Underburn	29	T35S, R3W, Sec. 9
903	Thin/Hand Pile/Hand Pile Burn/Underburn	18	T35S, R3W, Sec. 9
904	Thin/Hand Pile/Hand Pile Burn/Underburn	23	T35S, R3W, Sec. 9
905	Thin/Hand Pile/Hand Pile Burn/Underburn	16	T35S, R3W, Sec. 9
906	Thin/Hand Pile/Hand Pile Burn/Underburn	3	T35S, R3W, Sec. 9
Evans Creek East			
151	Thin/Hand Pile/Hand Pile Burn/Underburn	30	T34S, R2W, Sec. 10, 15
160	Thin/Hand Pile/Hand Pile Burn/Underburn	42	T34S, R2W, Sec. 16
160	Thin/Hand Pile/Hand Pile Burn/Underburn	36	T34S, R2W, Sec. 16
270	Thin/Hand Pile/Hand Pile Burn/Underburn	75	T34S, R2W, Sec. 27
900	Thin/Hand Pile/Hand Pile Burn/Underburn	28	T34S, R2W, Sec. 9
Evans South			
311	Thin/Hand Pile/Hand Pile Burn/Underburn	79	T36S, R4W, Sec. 3
335	Thin/Hand Pile/Hand Pile Burn/Underburn	41	T35S, R4W, Sec. 33
336	Thin/Hand Pile/Hand Pile Burn/Underburn	39	T35S, R4W, Sec. 33

Table A-1. Proposed Hazardous Fuels Reduction Prescriptions for the Butte Falls Hazardous Fuels Reduction Project

Unit Number	Prescription	Acres	Legal Description
336	Thin/Hand Pile/Hand Pile Burn/Underburn	9	T35S, R4W, Sec. 33
341	Thin/Hand Pile/Hand Pile Burn/Underburn	81	T35S, R4W, Sec. 34
351	Thin/Hand Pile/Hand Pile Burn/Underburn	55	T35S, R4W, Sec. 35
403	Thin/Hand Pile/Hand Pile Burn/Underburn	36	T36S, R4W, Sec. 4
Fielder Creek			
101	Thin/Hand Pile/Hand Pile Burn/Underburn	14	T36S, R5W, Sec. 1
102	Thin/Hand Pile/Hand Pile Burn/Underburn	121	T36S, R5W, Sec. 1
103	Thin/Hand Pile/Hand Pile Burn/Underburn	28	T36S, R5W, Sec. 1
104	Thin/Hand Pile/Hand Pile Burn/Underburn	42	T36S, R5W, Sec. 1
105	Thin/Hand Pile/Hand Pile Burn/Underburn	62	T36S, R5W, Sec. 1
121	Thin/Hand Pile/Hand Pile Burn/Underburn	29	T36S, R5W, Sec. 12
122	Thin/Hand Pile/Hand Pile Burn/Underburn	37	T36S, R5W, Sec. 12
123	Thin/Hand Pile/Hand Pile Burn/Underburn	17	T36S, R5W, Sec. 12
124	Thin/Hand Pile/Hand Pile Burn/Underburn	31	T36S, R5W, Sec. 12
311	Thin/Hand Pile/Hand Pile Burn/Underburn	21	T35S, R4W, Sec. 31
508	Thin/Hand Pile/Hand Pile Burn/Underburn	45	T36S, R4W, Sec. 5
701	Thin/Hand Pile/Hand Pile Burn/Underburn	57	T36S, R4W, Sec. 7
702	Thin/Hand Pile/Hand Pile Burn/Underburn	60	T36S, R4W, Sec. 7
703	Thin/Hand Pile/Hand Pile Burn/Underburn	29	T36S, R4W, Sec. 7
704	Thin/Hand Pile/Hand Pile Burn/Underburn	10	T36S, R4W, Sec. 7
707	Thin/Hand Pile/Hand Pile Burn/Underburn	40	T36S, R4W, Sec. 7
32-2	Thin/Hand Pile/Hand Pile Burn/Underburn	44	T35S, R4W, Sec. 32
Gold Hill/Highway 234			
101	Thin/Hand Pile/Hand Pile Burn/Underburn	80	T36S, R3W, Sec. 1
111	Thin/Hand Pile/Hand Pile Burn/Underburn	25	T36S, R3W, Sec. 11
112	Thin/Hand Pile/Hand Pile Burn/Underburn	12	T36S, R3W, Sec. 11
113	Thin/Hand Pile/Hand Pile Burn/Underburn	17	T36S, R3W, Sec. 11
121	Thin/Hand Pile/Hand Pile Burn/Underburn	21	T36S, R3W, Sec. 12
131	Thin/Hand Pile/Hand Pile Burn/Underburn	21	T36S, R3W, Sec. 13
Musty Donut			
23	Thin/Hand Pile/Hand Pile Burn/Underburn	20	T33S, R2W, Sec. 29
20-1	Thin/Hand Pile/Hand Pile Burn/Underburn	168	T34S, R2W, Sec. 20
21-1	Thin/Hand Pile/Hand Pile Burn/Underburn	41	T34S, R2W, Sec. 21
21-2	Thin/Hand Pile/Hand Pile Burn/Underburn	43	T34S, R2W, Sec. 21
21-3	Thin/Hand Pile/Hand Pile Burn/Underburn	86	T34S, R2W, Sec. 21
29a	Thin/Hand Pile/Hand Pile Burn/Underburn	68	T33S, R2W, Sec. 29
29b	Thin/Hand Pile/Hand Pile Burn/Underburn	72	T33S, R2W, Sec. 29
ODFW			
5-4	Thin/Hand Pile/Hand Pile Burn/Underburn /Broadcast Burn	13	T35S, R1E, Sec. 5
9-4	Thin/Hand Pile/Hand Pile Burn/Underburn	75	T34S, R1W, Sec. 9
11-2	Thin/Hand Pile/Hand Pile Burn/Underburn	24	T34S, R1W, Sec. 11

Table A-1. Proposed Hazardous Fuels Reduction Prescriptions for the Butte Falls Hazardous Fuels Reduction Project

Unit Number	Prescription	Acres	Legal Description
11-3	Thin/Hand Pile/Hand Pile Burn/Underburn	40	T34S, R1W, Sec. 11
14-1	Thin/Hand Pile/Hand Pile Burn/Underburn	28	T34S, R1W, Sec. 14
23-4	Thin/Hand Pile/Hand Pile Burn/Underburn	21	T34S, R1W, Sec. 23
27-2	Thin/Hand Pile/Hand Pile Burn/Underburn	26	T34S, R1W, Sec. 27
27-3	Thin/Hand Pile/Hand Pile Burn/Underburn	50	T34S, R2W, Sec. 27
31-2	Thin/Hand Pile/Hand Pile Burn/Underburn /Broadcast Burn	28	T34S, R1E, Sec. 31
Old Ferry Road			
101	Thin/Hand Pile/Hand Pile Burn/Underburn	189	T34S, R1W, Sec. 3, 10
111	Thin/Hand Pile/Hand Pile Burn/Underburn	122	T34S, R1W, Sec. 11
151	Thin/Hand Pile/Hand Pile Burn/Underburn	149	T34S, R1W, Sec. 14, 15
Pleasant Re-fry			
170	Thin/Hand Pile/Hand Pile Burn/Underburn	10	T35S, R4W, Sec. 17
171	Thin/Hand Pile/Hand Pile Burn/Underburn	20	T35S, R4W, Sec. 17
172	Thin/Hand Pile/Hand Pile Burn/Underburn	6	T35S, R4W, Sec. 17
272	Thin/Hand Pile/Hand Pile Burn/Underburn	115	T34S, R4W, Sec. 27
273	Thin/Hand Pile/Hand Pile Burn/Underburn	35	T34S, R4W, Sec. 27
274	Thin/Hand Pile/Hand Pile Burn/Underburn	35	T34S, R4W, Sec. 27
290	Thin/Hand Pile/Hand Pile Burn/Underburn	4	T34S, R4W, Sec. 29
291	Thin/Hand Pile/Hand Pile Burn/Underburn	39	T34S, R4W, Sec. 29
292	Thin/Hand Pile/Hand Pile Burn/Underburn	130	T34S, R4W, Sec. 29
293	Thin/Hand Pile/Hand Pile Burn/Underburn	5	T34S, R4W, Sec. 29
294	Thin/Hand Pile/Hand Pile Burn/Underburn	20	T34S, R4W, Sec. 29
295	Thin/Hand Pile/Hand Pile Burn/Underburn	129	T34S, R4W, Sec. 29
Pleasant Sardine (Private)			
4058	Thin/Hand Pile/Hand Pile Burn/Underburn	3	T35S, R3W, Sec. 33
4083	Thin/Hand Pile/Hand Pile Burn/Underburn	21	T35S, R3W, Sec. 32
4216	Thin/Hand Pile/Hand Pile Burn/Underburn	24	T35S, R3W, Sec. 33
5047	Thin/Hand Pile/Hand Pile Burn/Underburn	31	T34S, R4W, Sec. 21, 22
SE Shady Cove			
23-1	Thin/Hand Pile/Hand Pile Burn/Underburn	9	T34S, R1W, Sec. 23
23-2	Thin/Hand Pile/Hand Pile Burn/Underburn	74	T34S, R1W, Sec. 23
23-3	Thin/Hand Pile/Hand Pile Burn/Underburn	287	T34S, R1W, Sec. 23
27-1	Thin/Hand Pile/Hand Pile Burn/Underburn	86	T34S, R1W, Sec. 27
Wedgewood			
7-1	Thin/Hand Pile/Hand Pile Burn/Underburn	81	T35S, R1W, Sec. 7
West Shady Cove			
9-1	Thin/Hand Pile/Hand Pile Burn/Underburn	62	T34S, R1W, Sec. 9
9-2	Thin/Hand Pile/Hand Pile Burn/Underburn	45	T34S, R1W, Sec. 9
9-3	Thin/Hand Pile/Hand Pile Burn/Underburn	62	T34S, R1W, Sec. 9
17-1	Thin/Hand Pile/Hand Pile Burn/Underburn	121	T34S, R1W, Sec. 17
17-2	Thin/Hand Pile/Hand Pile Burn/Underburn	19	T34S, R1W, Sec. 17

Appendix B – Air Quality

MEMORANDUM OF UNDERSTANDING
Between the
OREGON DEPARTMENT OF FORESTRY
And the
OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

This **MEMORANDUM OF UNDERSTANDING** is hereby entered into by and between the Oregon Department of Forestry, hereinafter referred to as ODF, and the Oregon Department of Environmental Quality, hereinafter referred to as DEQ.

A. PURPOSE
The purpose of this MOU is to establish new requirements related to reducing smoke from slash pile burning on forest lands in Oregon, and to clarify provisions in DEQ Open Burning rules related to the burning of prohibited substances.

First, this MOU identifies Best Management Practices (BMPs) that will be used to reduce smoke emissions when burning slash piles covered with polyethylene (PE) covers. Covering slash piles before burning is a common practice in Oregon. The covers help keep the piles dry, make them much easier to ignite, improve combustion, and when BMPs are employed, can significantly reduce emissions.

Currently, DEQ open burning rules prohibit the burning of plastic and other waste that emits dense smoke or noxious odors. These rules address the waste disposal aspects of burning plastic rather than the intentional use of plastic as a best management practice to reduce emissions. This MOU clarifies that the use of PE covers on slash piles is a long-used prescribed burning practice that has been managed through the ODF administration of the Oregon Smoke Management Plan, and establishes BMPs that will be applied to this practice and regulated by ODF under the Oregon Smoke Management Plan.

Second, this MOU clarifies that the use of petroleum-based accelerants to help ignite slash material is also a common prescribed burning practice. Currently, DEQ open burning rules prohibit the burning of "petroleum products" related to waste disposal. As is the case with plastics, the disposal of petroleum products is not the issue. Accelerants have historically been used in prescribed burning operations for many years throughout Oregon for ignition purposes. The prohibition on burning of petroleum products under DEQ rules does not apply to the use of petroleum-based accelerants to ignite slash material.

B. STATEMENT OF MUTUAL BENEFIT AND INTERESTS

Combustion and Health Effects

It is acknowledged by both parties that the use of PE covers on slash piles can help improve combustion when these piles are burned. When BMPs are employed, this can significantly reduce emissions. The net air quality benefit in burning a pile that has been covered as compared to one which has not can also be significant. There is presently no evidence to conclude that burning small amounts of PE in a slash pile

poses any appreciable health risk. (See *Review of Potential Air Emissions From Burning Polyethylene Plastic Sheeting With Piled Forest Debris, Final Report*, Wrobel, Christopher and Reinhardt, Tim, URS Corporation, October 28, 2003.) Conversely, there is considerable evidence that poor combustion does produce more smoke and toxic air pollutants than good combustion. Evidence suggests the use of petroleum-based accelerants on slash material improves combustion, and the use of these accelerants also poses no appreciable health risk.

Regulatory Background

ORS 477.013 requires the State Forester and DEQ to approve a plan for managing smoke from prescribed burning. The same statute requires ODF to develop rules to carry out the provisions of the Smoke Management Plan. OAR 629-043-0043 establishes the Smoke Management Plan. This rule references the ODF "Smoke Management Directive 1-4-1-601", which contains specific requirements forest landowners must follow when conducting prescribed burning in Oregon.

ORS 477.552 specifies that it is state policy to minimize emissions from prescribed burning. To meet this objective, ORS 477.554 requires the State Forester to implement programs, including those involving "prescribed burning and other alternative slash management techniques" to be administered by ODF. ODF Directive 1-4-1-601 specifies the need to "minimize emissions from prescribed burning" (Policy section) and utilize "low emission-producing burning methods" (Special Guidance section).

DEQ's Open Burning Rules (Division 264) address the burning of "waste", and classify seven different types of burning: agricultural, commercial, construction, demolition, domestic, industrial and slash. Of these, agricultural and slash burning are exempt from DEQ regulation. (Note: for purposes of this MOU, slash burning and prescribed burning are considered the same.) OAR 340-264-0040(6) exempts slash burning from DEQ regulation, and states that it is regulated by ODF. With regard to open burning, DEQ rule 340-264-0060(3) prohibits the burning of any plastic, petroleum product, and other waste products that emit "dense smoke or noxious odors". This prohibition applies to "all open burning, unless expressly limited by any other rule, regulation, or permit….or other agency having jurisdiction." OAR 340-2640050(4)(a) requires "covering combustible material when practicable" to promote efficient burning and prevent excessive smoke.

General Agreement

Based on these statutory and rule requirements, both parties agree it is important to establish BMP's to reduce smoke emissions when burning slash piles with PE covers. It is acknowledged that using these covers to improve combustion and reduce emissions is consistent with ORS 477.552, OAR 629-043-0043, OAR 340-264-0050(4)(a), and the objectives of the Oregon Smoke Management Plan.

It is also mutually acknowledged by both parties under this MOU that the use of BMPs needs to be combined with other methods to minimize smoke emissions. Under the Smoke Management Plan, increasing the use of non-burning alternatives and emission reduction techniques (ERTs) are important objectives. This is especially true near populated areas and in the wildland urban interface, where a combination of burning and non-burning approaches is needed. In addition, public concerns on the burning of plastic (i.e., PE) on slash piles needs to be addressed through education and outreach. As a result, this MOU identifies the need for alternatives, ERTs, and public education to be used in conjunction with these BMPs.

Section E1 of this MOU identifies the BMPs agreed to by both parties.

C. ODF AGREES TO:

1. Perform outreach to inform private, state and local government, and federal forest landowners and protection districts in Oregon of the BMPs and other elements in this MOU.
2. Encourage that PE covers on slash piles only be used where needed, and encourage removal of the covers prior to burning if practicable.
3. Have the responsibility for ensuring compliance with BMPs identified in this MOU.
4. Incorporate the BMPs into prescribed burn permits, in accordance with ORS 477.515.
5. Develop a monitoring process to verify (1) that only PE is being used as a cover; (2) the thickness of the PE; and (3) the size of the covering, in accordance with Section E1 below.
6. As part of the current Smoke Management Plan review, revise ODF rules and Operational Guidance to the Smoke Management Plan to indicate that the use of PE covers on slash piles are subject to BMPs. During the interim, ODF will use its current authority to implement these BMPs and ensure compliance.
7. Include information on the ODF website on these BMPs, the need to use BMPs in conjunction with non-burning alternatives and ERTs, and the emission reduction benefits associated with using BMPs.
8. As part of the current Smoke Management Plan review, revise ODF rules and Operational Guidance to the Smoke Management Plan to indicate that the use of petroleum-based accelerants on slash material for ignition purposes shall be managed by ODF under the Oregon Smoke Management Plan.
9. Develop a work schedule for the tasks identified above in this section.

D. DEQ AGREES TO:

1. If requested, assist ODF in outreach efforts, per Section C1.
2. If requested, assist ODF in developing language to modify burn permits and revising rules and guidance, per Section C4, C6, and C8.
3. Use this MOU as policy guidance regarding the burning of PE covers on slash piles, when such burning is conducted under the Oregon Smoke Management Plan using the BMPs described in Section E1. DEQ shall continue to regulate the burning of plastic under its open burning rules where such burning is not associated with prescribed burning conducted under the Oregon Smoke Management Plan.
4. Use this MOU as policy guidance regarding the burning of petroleum-based accelerants on slash material, when such burning is conducted under the Oregon Smoke Management Plan. DEQ shall continue to regulate the burning of petroleum products under its open burning rules where such burning is not associated with prescribed burning conducted under the Oregon Smoke Management Plan.

E. IT IS MUTUALLY AGREED AND UNDERSTOOD BY BOTH PARTIES

1. Best Management Practices. The purpose of these BMPs is to improve combustion and minimize emissions from slash piles. If these objectives can be accomplished without the use of PE covers, this is the first BMP. Some of the criteria for BMPs (monitoring, minimum size, minimum thickness, and removal where practicable) are based on recommendations from the Oregon Smoke Management Plan Review Committee, from a letter sent to Marvin Brown, State Forester, on January 27, 2004. ODF shall not authorize a pile burn that fails to meet conditions (b)(d)(e) and (f) below, or if determined by ODF that cover removal is practicable, per condition (c) below. ODF may also require removal of any PE cover on a case-by-case basis using its discretion, if specific conditions warrant such action. Any burning that fails to comply with BMP conditions set forth in burn permits may be subject to ODF enforcement action. Additionally, any burning where the primary objective is the disposal of plastic waste shall be referred to DEQ for possible enforcement action under DEQ's open burning rules. Where practicable and economically feasible, BMPs will be used in conjunction with alternatives to burning. This includes chipping, yarding, marketing, and reducing pile size through mechanical removal. This will be strongly encouraged near sensitive populations and within the wildland urban interface.

   The following BMPs apply to the burning of slash piles with PE covers:

   a) No PE covers shall be used if the pile is dry and good combustion can be achieved without the use of PE covers.
   b) If PE covers are necessary, only polyethylene (PE) shall be used. Other plastics are prohibited.
   c) PE covers shall be removed where practicable. Removal near a major roadway, community, city or any smoke sensitive population is strongly encouraged. Limits on cover size and thickness shall not apply if the cover is to be removed prior to burning.
   d) The size of the PE cover shall not exceed 100 square feet. For small piles, covering only the ignition area instead of the entire pile is strongly encouraged.
   e) The thickness of the PE cover shall not exceed 4 mil.
   f) Layering of multiple covers within a pile is not permitted, unless authorized by ODF to meet ignition needs.
2. Petroleum-based Accelerants. The use of petroleum-based accelerants on slash material for ignition purposes is a recognized prescribed burning practice and shall be managed by ODF through the administration of the Oregon Smoke Management Plan.
3. Modification. Any modification of this MOU shall be made in writing by mutual consent of both parties, signed and dated by all parties, prior to any changes being made.
4. Commencement/Expiration Date. This MOU is effective as of the date of last signature and until December 31, 2008 at which time it will expire unless extended.
5. Termination. Either party, in writing, may terminate the MOU in whole, or in part, at any time before the date of expiration.
6. Principal Contact. The principal contacts for this MOU:

ODF Contact
Mike Ziolko
Oregon Department of Forestry
2600 State St.
Salem, OR 97301
Phone: 503-945-7452
mziolko@odf.state.or.us

DEQ Contact
Brian Finneran
Oregon Dept. of Environmental Quality
811 SW 6th Ave.
Portland, OR 97204
Phone: 503-229-6278
finneran.brian@deq.state.or.us

7. Non-fund obligation. This MOU is neither a fiscal nor a funds obligation document. Any endeavor to transfer anything of value involving reimbursement or contribution of funds between the parties to this instrument will be handled in accordance with applicable laws, regulations, and procedures including those for Government procurement and printing. Such endeavors will be outlined in separate agreements that shall be made in writing by representatives of the parties and shall be independently authorized by appropriate statutory authority. This MOU does not provide such authority. Specifically, this MOU does not establish authority for noncompetitive award to the cooperator of any contract or other agreement. Any contract or agreement for training or other services must fully comply with all applicable requirements for competition.

THE PARTIES HERERTO have executed this MOU:

/s/ Marvin Brown _____ _____3/28/05_____
MARVIN BROWN Date
State Forester
Oregon Department of Forestry

/s/ Stehanie Hallock _____ _____3/07/05_____
STEPHANIE HALLOCK Date
Director
Oregon Department of Environmental Quality

Appendix C – Soil

Table C-1. Soil Types found in Proposed Fuels Hazard Reduction Treatment Units

Unit Number	Fuels Treatment	Soil Type Name	Acres
Antioch Road/Musty			
3-1	Thin/Hand Pile/ Hand Pile Burn/Underburn	Langellian-Brader soil complex	46
		Vannoy soils	105
Butte Falls Highway			
5-1	Broadcast Burn	McNull-McMullin soil complexes	58
		Medco-McMullin soil complexes (pyroclastics clays)	37
		McMullin-Rock Outcropping soil complex	30
		McNull soils	1
5-2	Broadcast Burn	Medco-McMullin soil complexes (pyroclastics clays)	50
		McNull-McMullin soil complexes	3
		Medco soils (pyroclastics clays)	9
		McMullin-Rock Outcropping soil complex	22
		McNull-Medco soil complexes	8
		McNull soils	15
5-3	Broadcast Burn	McNull-McMullin soil complexes	9
		McMullin-Rock Outcropping soil complex	24
6-1	Broadcast Burn	McNull-McMullin soil complexes	36
		McMullin-Rock Outcropping soil complex	4
7-1	Broadcast Burn	McNull-McMullin soil complexes	55
		Medco-McMullin soil complexes (pyroclastics clays)	130
		McMullin-Rock Outcropping soil complex	128
		McMullin-Medco soil complexes	36
		Carney soils (pyroclastic clays)	46
		McNull soils	30
8-1	Broadcast Burn	Medco-McMullin soil complexes (pyroclastics clays)	26
		McNull soils	12
29-1	Broadcast Burn	McNull-McMullin soil complexes	3
		McMullin-Medco soil complexes	22
		McNull soils	2
31-1	Broadcast Burn	McNull soils	8
		McNull-McMullin soil complexes	12
Cardwell Creek			
271	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	12
272	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	14
		Beekman-Colestine soil complexes	35
		Vannoy soils	4

Table C-1. Soil Types found in Proposed Fuels Hazard Reduction Treatment Units

Unit Number	Fuels Treatment	Soil Type Name	Acres
273	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	53
		McMullin-Rock Outcropping soil complex	64
		Caris-Offenbacher soil complexes	33
274	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	4
		Beekman-Colestine soil complexes	44
		Caris-Offenbacher soil complexes	68
		Vannoy soils	10
33-1	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	23
		Vannoy soils	57
33-2	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	33
		Caris-Offenbacher soil complexes	21
Evans Creek			
171	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	46
172	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	3
173	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	10
		Josephine-Speaker soil complexes	6
191	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	104
		Shefflien soils (granitics)	19
192	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	17
193	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	17
		Shefflien soils (granitics)	12
		Tallowbox soils (granitics)	9
194	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	16
		Tallowbox soils (granitics)	13
195	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	7
		Shefflien soils (granitics)	6
196	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	27
197	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	19
198	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	9
211	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	72
		Josephine-Speaker soil complexes	11
212	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	7
		Josephine-Speaker soil complexes	18
213	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	19
		Josephine-Speaker soil complexes	3

Table C-1. Soil Types found in Proposed Fuels Hazard Reduction Treatment Units

Unit Number	Fuels Treatment	Soil Type Name	Acres
214	Thin/Hand Pile/ Hand Pile Burn/Underburn	Siskiyou soils (granitics)	4
		Beekman-Colestine soil complexes	20
221	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	8
		Josephine-Speaker soil complexes	16
222	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	3
		Josephine-Speaker soil complexes	16
231	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	34
232	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	49
251	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	10
		Abegg soils	3
		Josephine-Speaker soil complexes	3
		Josephine-Pollard soil complexes	11
252	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	16
253	Thin/Hand Pile/ Hand Pile Burn/Underburn	Wolfpeak soils (granitics)	18
		Josephine-Speaker soil complexes	13
254	Thin/Hand Pile/ Hand Pile Burn/Underburn	Wolfpeak soils (granitics)	3
		Abegg soils	4
		Josephine-Speaker soil complexes	26
		Beekman-Colestine soil complexes	8
255	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	9
		Beekman-Colestine soil complexes	28
		Tallowbox soils (granitics)	5
256	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	12
		Beekman-Colestine soil complexes	4
261	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	24
		Beekman-Colestine soil complexes	30
		Tallowbox soils (granitics)	42
262	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	62
		Josephine-Speaker soil complexes	5
263	Thin/Hand Pile/ Hand Pile Burn/Underburn	McMullin-Rock Outcropping soil complex	7
		Beekman-Colestine soil complexes	40
		Josephine-Speaker soil complexes	7
264	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	22
		Beekman-Colestine soil complexes	10
265	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	17
266	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	5

Table C-1. Soil Types found in Proposed Fuels Hazard Reduction Treatment Units

Unit Number	Fuels Treatment	Soil Type Name	Acres
267	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	5
271	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	7
		Beekman-Colestine soil complexes	181
272	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	29
281	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	18
		Josephine-Speaker soil complexes	17
291	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	42
321	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	26
		Josephine-Speaker soil complexes	140
322	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	6
		Josephine-Speaker soil complexes	21
331	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	90
		Josephine-Speaker soil complexes	41
332	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	43
		Josephine-Speaker soil complexes	19
		McMullin-Rock Outcropping soil complex	6
333	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	41
		Josephine-Speaker soil complexes	26
334	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	61
		Beekman-Colestine soil complexes	147
341	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	20
		Josephine-Speaker soil complexes	34
342	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	4
		Josephine-Speaker soil complexes	22
900	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	6
901	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	33
902	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	27
		Josephine-Speaker soil complexes	2
903	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	13
		Josephine-Speaker soil complexes	5
904	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Pollard soil complexes	3
		Josephine-Speaker soil complexes	20
905	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	16
906	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	3

Table C-1. Soil Types found in Proposed Fuels Hazard Reduction Treatment Units

Unit Number	Fuels Treatment	Soil Type Name	Acres
Evans Creek East			
151	Thin/Hand Pile/ Hand Pile Burn/Underburn	McNull-Medco soil complexes	13
		McNull soils	11
		Langellian-Brader soil complex	5
160	Thin/Hand Pile/ Hand Pile Burn/Underburn	McNull-Medco soil complexes	47
		Carney soils (pyroclastic clays)	4
		Langellian-Brader soil complex	5
		Vannoy soils	4
		McNull soils	18
270	Thin/Hand Pile/ Hand Pile Burn/Underburn	Langellian-Brader soil complex	75
900	Thin/Hand Pile/ Hand Pile Burn/Underburn	McNull soils	4
		McNull-Medco soil complexes	23
Evans South			
311	Thin/Hand Pile/ Hand Pile Burn/Underburn	Shefflien soils (granitics)	76
		Tallowbox soils (granitics)	3
335	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	18
		Caris-Offenbacher soil complexes	23
336	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	47
351	Thin/Hand Pile/ Hand Pile Burn/Underburn	Shefflien soils (granitics)	81
341	Thin/Hand Pile/ Hand Pile Burn/Underburn	Shefflien soils (granitics)	55
403	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	36
Fielder Creek			
101	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	8
		Manita soils	7
102	Thin/Hand Pile/ Hand Pile Burn/Underburn	McMullin-Rock Outcropping soil complex	20
		Beekman-Colestine soil complexes	37
		Manita soils	25
		Vannoy soils	39
103	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	19
		Manita soils	8
104	Thin/Hand Pile/ Hand Pile Burn/Underburn	Manita soils	33
		Vannoy soils	9
105	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	34
		Manita soils	28
121	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	19
		Beekman-Colestine soil complexes	10

Table C-1. Soil Types found in Proposed Fuels Hazard Reduction Treatment Units

Unit Number	Fuels Treatment	Soil Type Name	Acres
122	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	33
		Vannoy soils	2
123	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	16
124	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	31
311	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	7
		Vannoy soils	14
508	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	32
		Vannoy soils	4
		McMullin-Rock Outcropping soil complex	9
701	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	14
		Vannoy soils	43
702	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	7
		McMullin-Rock Outcropping soil complex	4
		Caris-Offenbacher soil complexes	49
703	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	4
		Vannoy soils	5
		McMullin-Rock Outcropping soil complex	20
704	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	5
		McMullin-Rock Outcropping soil complex	5
707	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	32
		Caris-Offenbacher soil complexes	8
32-2	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	24
		Vannoy soils	16
		Josephine-Speaker soil complexes	4
Gold Hill/Highway 234			
101	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	80
111	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	4
		Abegg soils	15
		Ruch soils	7
112	Thin/Hand Pile/ Hand Pile Burn/Underburn	Ruch soils	5
		Abegg soils	6
113	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	17
121	Thin/Hand Pile/ Hand Pile Burn/Underburn	Ruch soils	8
		Vannoy soils	9
		Manita soils	4
131	Thin/Hand Pile/ Hand Pile Burn/Underburn	Manita soils	21

Table C-1. Soil Types found in Proposed Fuels Hazard Reduction Treatment Units

Unit Number	Fuels Treatment	Soil Type Name	Acres
Musty Donut			
23	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	6
23	Thin/Hand Pile/ Hand Pile Burn/Underburn	Goolaway soils (schists)	13
20-1	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	81
20-1	Thin/Hand Pile/ Hand Pile Burn/Underburn	Shefflien soils (granitics)	87
21-1	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	3
21-1	Thin/Hand Pile/ Hand Pile Burn/Underburn	Langellian-Brader soil complex	38
21-2	Thin/Hand Pile/ Hand Pile Burn/Underburn	Langellian-Brader soil complex	38
21-2	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	5
21-3	Thin/Hand Pile/ Hand Pile Burn/Underburn	Shefflien soils (granitics)	86
29a	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	13
		Goolaway soils (schists)	54
		Josephine-Pollard soil complexes	2
29b	Thin/Hand Pile/ Hand Pile Burn/Underburn	Goolaway soils (schists)	9
		Josephine-Pollard soil complexes	63
Old Ferry Road			
101	Thin/Hand Pile/ Hand Pile Burn/Underburn	McNull soils	55
		Medco soils (pyroclastics clays)	90
		McMullin-Medco soil complexes	43
111	Thin/Hand Pile/ Hand Pile Burn/Underburn	McNull soils	23
		McMullin-Medco soil complexes	35
		Medco soils (pyroclastics clays)	57
		McNull-McMullin soil complexes	33
151	Thin/Hand Pile/ Hand Pile Burn/Underburn	Medco soils (pyroclastics clays)	51
		Medco-McMullin soil complexes (pyroclastics clays)	3
		McNull soils	53
		McNull-McMullin soil complexes	34
		McMullin-Rock Outcropping soil complex	8
Pleasant Re-fry			
170	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	3
		Abegg soils	7
171	Thin/Hand Pile/ Hand Pile Burn/Underburn	Ruch soils	16
		Abegg soils	3

Table C-1. Soil Types found in Proposed Fuels Hazard Reduction Treatment Units

Unit Number	Fuels Treatment	Soil Type Name	Acres
172	Thin/Hand Pile/ Hand Pile Burn/Underburn	Ruch soils	6
		Siskiyou soils (granitics)	96
		Wolfpeak soils (granitics)	12
		Shefflien soils (granitics)	6
273	Thin/Hand Pile/ Hand Pile Burn/Underburn	Siskiyou soils (granitics)	33
		Wolfpeak soils (granitics)	3
274	Thin/Hand Pile/ Hand Pile Burn/Underburn	Tallowbox soils (granitics)	28
		Siskiyou soils (granitics)	7
290	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	4
291	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	32
		Beekman-Colestine soil complexes	13
		Josephine-Pollard soil complexes	14
292	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	96
		Beekman-Colestine soil complexes	29
		Josephine-Pollard soil complexes	5
293	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Pollard soil complexes	5
294	Thin/Hand Pile/ Hand Pile Burn/Underburn	Josephine-Speaker soil complexes	20
295	Thin/Hand Pile/ Hand Pile Burn/Underburn	Shefflien soils (granitics)	7
		Josephine-Speaker soil complexes	122
Pleasant Sardine			
4216	Thin/Hand Pile/ Hand Pile Burn/Underburn	Caris-Offenbacher soil complexes	5
		Vannoy soils	19
4058	Thin/Hand Pile/ Hand Pile Burn/Underburn	Vannoy soils	3
4083	Thin/Hand Pile/ Hand Pile Burn/Underburn	Beekman-Colestine soil complexes	21
5047	Thin/Hand Pile/ Hand Pile Burn/Underburn	Wolfpeak soils (granitics)	20
		Siskiyou soils (granitics)	11
SE Shady Cove			
23-1	Thin/Hand Pile/ Hand Pile Burn/Underburn	Medco soils (pyroclastics clays)	5
		McNull soils	3
23-2	Thin/Hand Pile/ Hand Pile Burn/Underburn	Medco soils (pyroclastics clays)	23
		McNull soils	51

Table C-1. Soil Types found in Proposed Fuels Hazard Reduction Treatment Units

Unit Number	Fuels Treatment	Soil Type Name	Acres
23-3	Thin/Hand Pile/ Hand Pile Burn/Underburn	Medco-McMullin soil complexes (pyroclastics clays)	34
		Medco soils (pyroclastics clays)	30
		McMullin-Rock Outcropping soil complex	18
		McNull-McMullin soil complexes	58
		McNull soils	56
		McMullin-Medco soil complexes	91
27-1	Thin/Hand Pile/ Hand Pile Burn/Underburn	Medco-McMullin soil complexes (pyroclastics clays)	22
		McMullin-Rock Outcropping soil complex	6
		McMullin-Medco soil complexes	18
		McNull soils	32
		McNull-McMullin soil complexes	7
Wedgewood			
7-1	Thin/Hand Pile/ Hand Pile Burn/Underburn	Carney soils (pyroclastic clays)	45
		McMullin-Rock Outcropping soil complex	36
West Shady Cove			
9-1	Thin/Hand Pile/ Hand Pile Burn/Underburn	McNull soils	3
		Medco soils (pyroclastics clays)	31
		McMullin-Medco soil complexes	9
		McNull-McMullin soil complexes	18
9-2	Thin/Hand Pile/ Hand Pile Burn/Underburn	Medco soils (pyroclastics clays)	15
		McMullin-Medco soil complexes	11
		McNull soils	11
		Medco soils (pyroclastics clays)	7
9-3	Thin/Hand Pile/ Hand Pile Burn/Underburn	Medco soils (pyroclastics clays)	52
		Medco-McMullin soil complexes (pyroclastics clays)	10
17-1	Thin/Hand Pile/ Hand Pile Burn/Underburn	Medco-McMullin soil complexes (pyroclastics clays)	24
		McMullin-Rock Outcropping soil complex	73
		McNull-Medco soil complexes	24
17-2	Thin/Hand Pile/ Hand Pile Burn/Underburn	Medco soils (pyroclastics clays)	15
17-2	Thin/Hand Pile/ Hand Pile Burn/Underburn	McNull-Medco soil complexes	4

Appendix D – Aquatic Conservation Strategy

Butte Falls Fuels Hazard Reduction Project

Aquatic Conservation Strategy

Components of the Aquatic Conservation Strategy (ACS)

The following are four main components to the ACS: Riparian Reserves, Key Watersheds, Watershed Analysis (WA), and Watershed Restoration.

Riparian Reserves:

The 1995 Medford District ROD/RMP (p. 27) states, "As a general rule, management actions/direction for riparian reserves prohibits or regulates activities that retard or prevent attainment of Aquatic Conservation Strategy . . . objectives."

Riparian reserves are equal to the distance of one site-potential tree on non-fish-bearing streams and two site-potential trees on fish-bearing streams. The BLM would maintain a 60-foot no-treatment buffer on all fish-bearing and perennial streams and a 35-foot no-treatment buffer on long-term intermittent streams. There would be no overstory removal in any riparian reserves throughout the entire Butte Falls Hazardous Fuels Removal Project.

The riparian reserve width for the proposed project is 175 feet within the Evans Creek fifth field watershed and 165 feet within the Gold Hill/Rogue River and Shady Cove/Rogue River fifth field watersheds. These buffers consist of the area on each side of the stream extending from the edges of the active stream channel from a minimum of 175 feet to a maximum of 350 feet slope distance within the Evans Creek fifth field watershed and a minimum of 165 feet to a maximum of 330 feet slope distance within the Gold Hill/Rogue River and Shady Cove/Rogue River fifth field watersheds.

The proposed activities considered in the riparian reserves for this project include hazardous fuels removal by hand treatments including slashing, hand piling, burning hand piles, underburning, and broadcast burning.

Key Watersheds:

The Butte Falls Hazardous Fuels Reduction Project is located entirely outside of Key Watersheds. Tier 1 Key Watersheds contribute directly to conservation of at-risk salmonids and resident fish species. These watersheds have a high potential for being restored as part of a watershed restoration program (ROD pg. 22).

Watershed Analysis:

The relevant watershed analyses are:

- Watershed Analysis of Lower Evans Creek (1995)
- Mid Evans Creek Landscape Analysis (1995)
- Watershed Analysis of West Fork of Evans Creek (1995)
- Watershed Analysis of East Evans Creek (1996)

Watershed analysis is intended to enable landscape-scale project planning that can achieve ACS objectives. "Watershed analysis will serve as the basis for BMP design during project-specific planning" (ROD/RMP, p. 152).

Watershed Restoration:

The Standards and Guidelines for the Northwest Forest Plan identify three important components of a watershed restoration program, ". . . control and prevention of road-related runoff and sediment production, restoration of the condition of riparian vegetation, and restoration of in-stream habitat complexity" (NWFP, p. B-31).

Project Summary

The Butte Falls Resource Area is proposing to reduce hazardous fuels on approximately 7,900 acres located within three fifth field watersheds. Approximately 7,900 acres of vegetation would be thinned, slash would be hand piled and burned or broadcast burned, and the treated acres would be maintenance thinned or underburned in 3 to 10 years. This project is proposed within matrix and riparian reserve land use allocations.

In order to reduce fuel loadings and the likelihood of a wildfire, conifers and hardwoods greater than 1 foot tall and less than 8 inches dbh would be cut to a 25-foot by 25-foot spacing. Shrub species greater than 1 foot tall and less than 12 inches in diameter would be thinned to a 45-foot by 45-foot spacing. No overstory trees would be thinned. The slash material would be hand piled and burned or broadcast burned using a low to moderate intensity fire. Follow-up treatments include underburning and additional thinning.

Project Design Features that would maintain or restore Aquatic Conservation Strategy Objectives

The following Project Design Features are included in the design of the projects in Alternative 2. These Project Design Features are a compilation of Best Management Practices identified in the Medford District ROD/RMP and resource protection measures identified by the Interdisciplinary Team. The Project Design Features would serve as a basis for resource protection in the implementation of the projects.

1. Conduct prescribed burns under moderated weather conditions when soil moisture is elevated in order to reduce surface fuel loading in the 0- to 3-inch diameter size class by 60 to 80 percent. Whenever possible, burning will be planned during conditions that will allow heavier fuels to remain on-site and not fully consume.
2. Develop an approved prescribed fire plan for all prescribed burn units prior to ignition and in compliance with the *Interagency Prescribed Fire Planning and Implementation Procedures Guide* (http://www.fs.fed.us/fire/fireuse/rxfire/rxfireguide.pdf). The prescribed burn plan will contain measurable objectives, a predetermined prescription, and contingency plan to be implemented in the event of an escaped burn.
3. Monitor burning conditions closely to prevent fire escape and to minimize damage to residual trees and vegetation.
4. Conduct prescribed burns only when soil moisture is sufficient (generally greater than 35 percent) to prevent consumption of the duff layer. Duff consumption in a burn unit should not exceed 2 to 10 percent for low to moderate burns (1995 ROD/RMP, p. 169).
5. Construct water bars on firelines according to District spacing guidelines (1995 ROD/RMP, p. 167).
6. Construct all firelines by hand.
7. Rehabilitate all firelines and water bars constructed for this project that intersect existing roads or trails to the extent that unauthorized off-highway vehicle (OHV) use is discouraged. This could include dragging cut vegetation over the lines, seeding, or mulching to hide the firelines at points where they intersect roads or existing trails.
8. Do not hand pile slash (or burn hand piles) in the channel bottom of short-duration intermittent streams, or within the draw bottom of dry draws.
9. Disperse piles across treatment areas. Whenever possible, pile burning will be planned and scheduled when surrounding vegetation and organic material moisture content is enough to maintain an unburned ring of woody material on the ground surrounding the burn pile. This helps to prevent exposed soils from moving beyond the burn pile site.
10. Close all natural surface roads opened during fuel hazard reduction prior to the wet season.

12. Keep foam retardant out of riparian reserves.

13. Refuel and maintain equipment (e.g., drip torches, chainsaws) a minimum of 100 feet from waterbodies and wetlands.

14. Ignite prescribed burns outside riparian buffers.
15. Allow low intensity prescribed burns to back into riparian reserves
16. Limit fireline construction inside riparian reserves.
17. Where firelines *are* constructed in riparian reserves, construct by hand and place slash or other native mulch materials on firelines to provide 80 percent effective ground cover.
18. No treatment or pile burning will occur within 60 feet, each side, of fish-bearing or perennial streams.
19. No treatment will occur within 35 feet, each side, of long-duration, intermittent streams.
20. No treatment will occur within 60 feet from the edge of springs, seeps, wetlands, and ponds.
21. Prohibit the removal of material for firewood, poles, or other special forest products within riparian reserves.
22. Ensure fuels treatments within riparian reserves will not result in less than 50 percent canopy cover post-treatment.
23. Exclude fuels treatments from inner gorge slopes 35 percent or greater along all streams.
24. Perform prescribed burns when moisture conditions are high enough and prescription windows are at a level so that no more than 50 percent of the mound depth/duff layer around pine trees is consumed during burning.
25. Implement prescribed burning when soil and duff moisture and weather conditions allow for low intensity burning in order to minimize tree stress and adverse effects on tree roots and foliage.
26. Leave approximately 10 percent of each unit untreated. This will include untreated riparian buffers and special status plant and wildlife buffers.

Under Alternative 2, fuels treatments are proposed on approximately 7,900 acres: 3,903 acres in upland areas and 4,000 acres within riparian reserves.

No treatments (e.g., cutting, hand piling, or direct ignition) would be allowed within a minimum of 60 feet either side of the channel on perennial streams, and within 35 feet either side of the channel on long duration, intermittent streams. Treating vegetation adjacent to short duration intermittent and dry draw channels would be allowed as necessary to accomplish fuels objectives with the following Project Design Features: 1) slash will not be piled or burned in the channel bottom of short-duration streams, or within the draw bottom of dry draws, 2) any firelines adjacent to or crossing channels will be water-barred and rehabilitated after ignition operations are complete to ensure that the fire-lines are not able to intercept and transport water and displaced sediment/ash downslope and into the channels during rain events, and 3) all firelines and water bars constructed for this project, including those in upland areas, that intersect existing roads or trails will be rehabilitated to the extent that unauthorized Off Highway Vehicle use is discouraged and that intercepted water cannot erode and rut the disturbed areas. This could include dragging cut vegetation over the lines, seeding, or mulching to hide the firelines at points where they intersect roads or existing trails.

Overstory vegetation would not be thinned. In areas lacking large canopy (brush fields) leave vegetation would be retained (see PDFs). As such, canopy cover would not be measurably reduced at the landscape level. Fuel reduction activities would not increase ground compaction because no machinery will be used off roads. Because canopy cover and compaction would remain unaffected, treatments would have no mechanism to affect peak stream flows.

Vegetative buffers left around stream channels and debris rings around burned piles would be sufficient to capture any chance off-site movement of disturbed particulates, such as ash or bare soil, resulting from the treatments. As such, sediment delivery to aquatic habitats resulting from the project is not anticipated to occur. Buffers would maintain shade levels around streams that would be susceptible to increased water temperature during the summer months (perennial and long duration, intermittent streams). Short duration, intermittent streams and dry draws would be dry during the summer. Hence, summer water temperatures would not be increased as a direct result of the treatments.

Implementation of this project would reduce the likelihood of an unnaturally severe wildfire occurring to some extent in all watersheds, while not affecting aquatic habitat parameters. As such, it would not affect fisheries or aquatic resources, including coho critical habitat and essential fish habitat. Therefore, Aquatic Conservation Strategy objectives would be maintained.

BLM/OR/WA/AE-09/076+1792