USDA

United States
Department of
Agriculture

Forest
Service

February 2007

# Environmental Assessment

## OPINE VEGETATION MANAGEMENT ENVIRONMENTAL ANALYSIS

**Bend-Ft. Rock Ranger District, Deschutes National Forest**
**Deschutes County, Oregon**

**ALTERNATIVES**
**ALTERNATIVE 1 – NO ACTION**
**ALTERNATIVE 2 – PROPOSED ACTION**
**ALTERNATIVE 3 – MODIFIED PROPOSED ACTION**

**ALTERNATIVE 3 is the PREFERRED ALTERNATIVE**

For Information Contact: John Davis
Bend-Ft. Rock Ranger District
1230 NE 3rd St. A-262
Bend, OR 97701
(541) 383-4714

Abstract: The Opine Planning Area is a good example of eastern Oregon High Desert landscape. The planning area is surrounded by flat scrub lands with dispersed pockets of ponderosa and lodgepole pine trees (see photos in Chapter 3 under Off-Highway Vehicle section). Elevations within the planning area range from 4,500 to 6,509 feet above sea level at the top of Pine Mountain. On top of the mountain is located the University of Oregon Observatory, which is visited by thousands of students and the public each year. Pine Mountain is one of the primary focus areas proposed for fuel reduction treatments including thinning, mowing, and burning. Mule deer winter range dominates the planning area, which also includes small areas of summer range. Field trips have been made to the planning area with the Oregon Department of Fish and Wildlife to address specific concerns they have regarding deer habitat.

A portion of the planning area is within East Fort Rock Off-Highway Vehicle (OHV) area and has approximately 100 miles of designated OHV trails and routes. The trail system is currently open all year with OHV use occurring in the spring, summer and fall. A seasonal closure is proposed, but would not be applied to designated trails within East Fort Rock OHV area. The issues surrounding the planning area identified by the Interdisciplinary Team, during public scoping, and 30-day public comment period are: 1) Effects on Mule Deer Habitat, which include: Vegetation Treatments; and effects of Open Road and Motorized Trails on Habitat Effectiveness; 2) Condition of Existing Vegetation; and 3) Wildfire Risk.

**Northwest corner of Pine Moutain**

# CHAPTER 1 - INTRODUCTION

The Forest Service has prepared this Environmental Assessment (EA), the Opine Vegetation Management EA, in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This environmental assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into the following sections:

***Chapter 1 Introduction:*** Includes information on the history of the project proposal, the purpose of and need for the project, the agency's proposal for achieving that purpose and need, and public involvement.

***Chapter 2 Alternative Discussion:*** Provides a description of the alternatives for achieving the stated purpose. Alternatives were developed based on issues raised by the public and Forest Service. A comparison table of the activities of each alternative is included. Mitigation measures, management requirements, and Best Management Practices are listed that would prevent adverse effects to the environment, through alternative implementation.

***Chapter 3 Affected Environment and Environmental Consequences:*** Describes the existing condition of each resource and the effects each alternative would have on the environment. The effects of the No Action Alternative provide a baseline for evaluation and comparison with the other alternatives.

***Chapter 4 Agencies and Persons Consulted:*** Provides a list of agencies and persons consulted during the development of the environmental assessment.

***Chapter 5 List of Preparers:*** Provides a list of specialists and others involved in the analysis and preparation of this document.

***Appendices:*** The appendices provide more detailed information to support the analyses presented in the environmental assessment.

All distance, acreage, volume, and other numbers found throughout this document are approximate. Small differences between numbers, particularly acreages, may occur. These differences are likely due to a variety of reasons, including but not limited to the following:

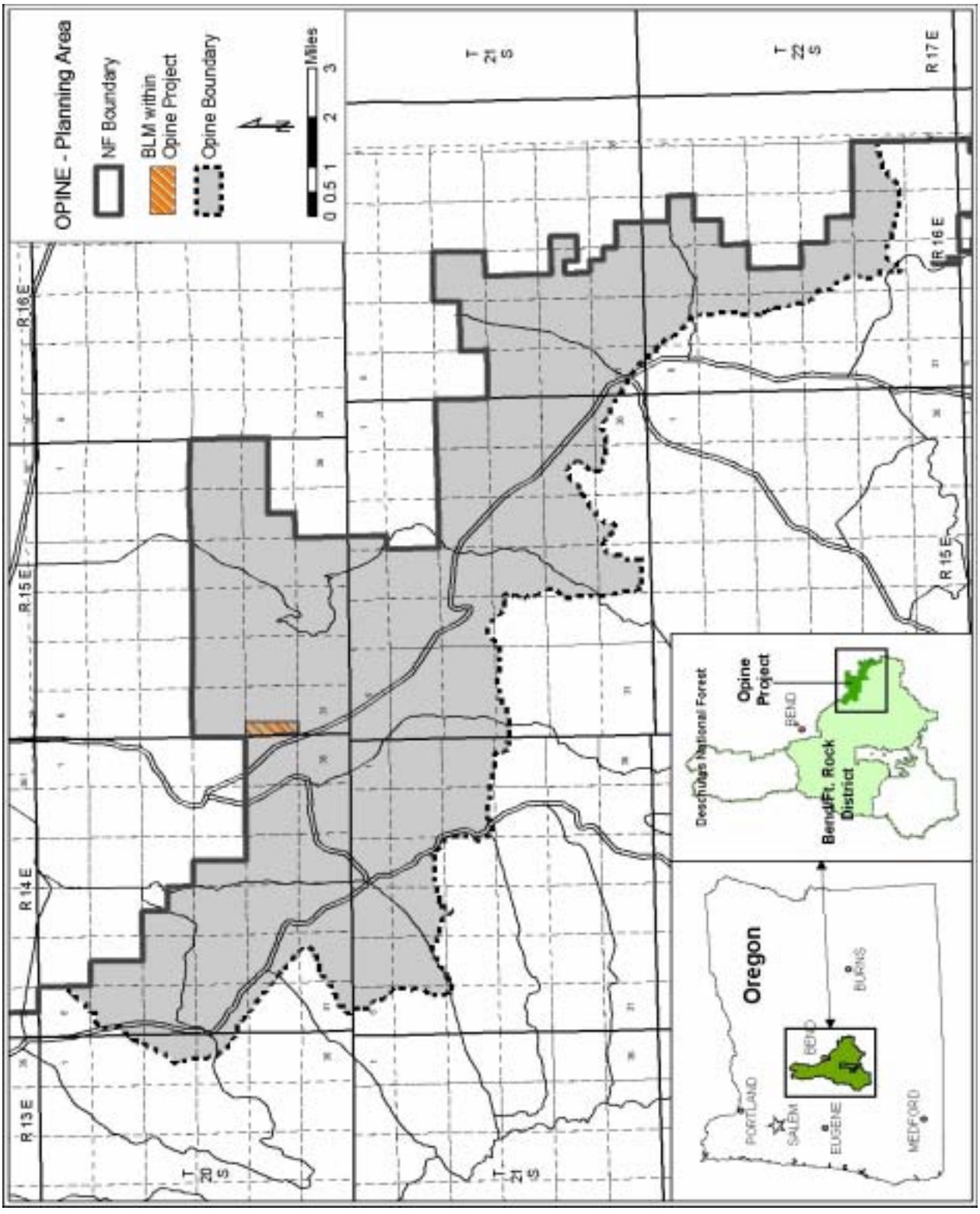
- Rounding of numbers;
- The use of different data sets between analyses;
- Differences in the parameters of the data request; and
- Mapping differences.

## PROJECT AREA LOCATION

The planning area, 54,623 acres (Figure 1-1), including 165 acres of federal lands managed by the Bureau of Land Management (BLM), is located approximately 20 miles southeast of the city of Bend, Oregon and approximately five (5) miles south of US 26 and Millican, Oregon.

Elevations within the planning area range from approximately 4,500 feet above sea level in the northwest portion of the planning area to 6,509 feet at the top of Pine Mountain.

**Figure 1-1 Vicinity Map - Opine Planning Area.**



The planning area is located within T20S, R13E, Sections 12, 13, and 24; T20S, R14E, Sections 6-8, 16-22, 25-29, and 31-36; T20S, R15E, Sections 19-34; T21S, R14E, Sections 1-16; T21S, R15E, Sections 3-9, 13-29, and 32-36; T21S, R16E, Sections 16, 17, 19-21, 27-30, and 31-34; and T22S, R16E, Sections 3-6, 8-10, 16, 17, 20-22, and 26-28.

## BACKGROUND

The planning area includes the Pine Mountain Observatory, located on top of Pine Mountain and is situated on nine (9) acres of National Forest lands. The facility is owned and managed by the University of Oregon under a special use permit issued by the Deschutes National Forest. The planning area includes all or portions of three (3) range allotments; Cinder Cone, Pine Mountain, and Sand Springs. The planning area also includes 25,976 acres (approximately 23 percent) of the 114,063 acre East Fort Rock Off-Highway Vehicle (OHV) area, including approximately 100 miles of designated OHV trails and routes.

In the past 3 years Forest Supervisor Leslie A.C. Weldon has signed three separate Decision Notices and Finding of No Significant Impact for: 1) the Pine Mountain Observatory Master Plan EA (June 25, 2004); 2) The Cinder Hill Range Allotment EA (July 7, 2004); and 3) the Cluster II Range Allotment EA (January 20, 2006). All or portions of the planning areas analyzed under these EA's are within the Opine Vegetation Management EA planning area boundary. No changes in the planning area boundary, the purpose and need, or the decision to be made for the Opine Vegetation Management EA resulted from these decisions.

A total of 23 fires, totaling approximately 29,400 acres have occurred in the planning area since 1911 with eight (8) of those fires, totaling approximately 2,000 acres, having occurred during the past 30 years.

There are no known Threatened or Endangered species present within the planning area boundaries. There are plant and animal species listed as sensitive on the Region 6 Regional Forester's Sensitive Species List present within the planning area.

There are no Inventoried Roadless Areas or unroaded characteristics within or adjacent to the planning area boundaries. The nearest such area is associated with the Newberry National Volcanic Monument, approximately six (6) to 10 air miles west and southwest of the planning area.

There would be no flow impacts to the Deschutes River Basin, because there are no streams within or adjacent to the project area and soils that allow for rapid infiltration of precipitation without the potential of overland flow reaching perennial stream channels. There are no perennial streams, lakes, or other permanent water bodies within the planning area boundary. Any channeled surface flows within ephemeral channels are discontinuous and travel short distances.

The planning area lies outside the area of the Northwest Forest Plan (NWFP) boundaries.

## PURPOSE AND NEED

The Deschutes National Forest, Forest Supervisor, Bend-Fort Rock District Ranger, and the Interdisciplinary Team members for the Opine Planning Area have determined the need for reductions in natural fuels including reductions in shrub and forest stand densities as well as for providing

commercially viable wood fiber to support local mills and the local economy. Vegetation management and fuel reduction activities are intended to:

- Strategically reduce fuel loadings and forest vegetation density so as to lessen the risk that disturbance events such as insect, disease, and wildfire will lead to large-scale loss of forest and shrub habitats. As used here, the term, "strategically" means to locate a mix of management actions in specific places on the landscape where they will reduce the risk to desired habitats. Emphasis is placed on reducing risks to desired habitats such as late and old-structured stands, xeric shrublands, and large trees;
- protect developments such as the Pine Mountain Observatory, electronic sites; transmission lines, range improvements, and other similar improvements and facilities from large-scale wildfire; and
- provide timber and other wood fiber products to contribute to local and regional economies resulting from these activities.

Activities are also intended to move toward improving conditions within all management allocations in the planning area (see below).

**Need for Action**

It is not practical to rely on natural succession and disturbance processes to resolve decades of fuels accumulations in much of the planning area. Thinning and other fire/fuel hazard reduction treatments are necessary not only to reduce the wildfire potential and intensity, but to manage stands that are currently at risk to bark beetle infestation due to overstocked trees.

There are four major designated land allocations within the planning area that are described in the LRMP. They are Deer Habitat, General Forest, Scenic Views, and Old Growth. Within these allocations there is a need for:

1. vegetation conditions that reflect the high frequency/low intensity fire regime that occurred historically in this area;
2. stand conditions in ponderosa pine that mimic conditions that occur in the presence of endemic levels of insect and disease activity; and
3. fuel reduction and timber production consistent with management area goals and objectives and environmental constraints.

Specifically there is a need for:

a) stands of park-like, old growth ponderosa pine similar to those present prior to Euro-American settlement
b) reduced competition for site resources among ponderosa pine within areas historically supporting ponderosa pine;
c) reduced natural fuel loadings; and
d) a landscape characterized by discontinuous hazardous fuels. Hazardous fuels are broken up by fuel condition unlikely to support an uncharacteristic wildfire. Reduced hazardous fuels are arranged strategically across the landscape and are of a size and orientation that reduce the likelihood of large fire spread, lessen post-wildfire damage, and facilitate successful fire suppression under severe wildfire conditions. Strategic locations include:
    - The areas adjacent to the Pine Mountain Observatory, electronic sites, the Bonneville Power Administration (BPA) Sand Springs Compensation Station transmission line right-of-way; and developed facilities associated with the East Fort Rock Off-Highway Vehicle (OHV) trail system;
    - adjacent private and public lands; and
    - adjacent to primary travel routes that provide egress or ingress to the planning area including Forest Roads 18, 2017, 23, 25, and 2510.

## PROPOSED ACTION

The action proposed by the Forest Service to meet the purpose and need is to implement a variety of vegetation (commercial and non-commercial thinning) and fuels reduction treatments on 26,638 acres. This includes approximately 6,468 acres of thinning and regeneration harvest treatments in ponderosa pine and lodgepole pine stands. Within these treated stands are also proposed 5,312 fuels reduction treatments. An additional 20,170 acres of fuel reduction treatments in xeric shrublands and forest stands are proposed outside of the commercial and non-commercial treatments.

The proposed action includes the following activities:

**Commercial Thinning and Regeneration Harvest Units**

- Thin to create or maintain single story stands and culture large trees (1,620 acres);
- Thin to reduce stand competition, culture large trees and retain a combination of single story and multi-story canopy (2,355 acres);
- Regeneration clearcut harvest to reduce the incidence and spread of dwarf mistletoe in ponderosa pine (38 acre)
- Regeneration shelterwood harvest to reduce incidence of insects in lodgepole pine (108 acres);

**Non-Commercial Thinning Units**

- Thin to reduce stand competition, culture large trees and retain a single story canopy (2,347 acres);

***Total: 6,468 acres***

**Fuels Reduction in Commercial Units**

- Fuels Reduction units underburning (1,702 acres);
- Fuels Reduction units with burning beneath the dripline (1,323);

**Fuels Reduction in Non-Commercial Units**

- Fuels Reduction units underburning (2,002 acres)
- Fuels Reduction with burning beneath the dripline (285 acres)

***Total: 5,312 acres*** Fuels Reduction within Commercial and Non-Commercial Treatments

**Fuels Reduction in Xeric Shrublands and Forest Stands Units**

- Underburning (5,299 acres);
- Burning beneath the dripline (2,064 acres) ;
- Pretreat (cut trees less than 4 inches dbh with follow-up underburn) and Underburn (9,553 acres);
- Pretreat, Machine Pile, Burn Piles, and Mow (147 acres);
- Pretreat, Machine Pile, Burn Piles, & Underburn (2,140 acres);
- Pretreat, Mow, & Underburn (307 acres);
- Hand Fall or Mow Juniper 9 inches dbh and less (335 acres);
- Hand Fall or Mow Juniper 9 inches dbh and less , Mow, Underburn (133 acres);
- Mow (192 acres).

***Total: 20,170 acres***

A detailed description of the proposed action, including tables or maps showing the locations of all activities, can be found in Chapter 2 of this document.

### *Connected Actions*

In order for the Proposed Action to be implemented, the following connected actions would also need to be implemented[1]:

- About 19 miles of currently opened roads would be closed (3 miles) and decommissioned (remove from the transportation system) / subsoiling (16 miles) to mitigate the effects of vegetation and fuel reduction treatments on wildlife habitat, particularly to reduce the effects of reductions in hiding and thermal cover and to reduce habitat fragmentation.
- Road maintenance to apply clay or crushed aggregate to surface on about 30 miles of roads.
- Road maintenance, especially blading, brushing, and shaping would be performed on about 8.0 miles of roads.
- About 1.05 miles of temporary roads would be constructed to facilitate economical timber harvest and obliterated/subsoiled upon completion of harvest activities.
- Tree planting on 49.25 acres

Road closures and decommissioning would be used to mitigate the effects of vegetation and fuel reduction treatments on wildlife habitat, particularly to reduce the effects of reductions in hiding and thermal cover and to reduce habitat fragmentation. Approximately 19 miles of forest system roads would be closed or decommissioned. This includes the closure of approximately 3.0 miles and the decommissioning of approximately 16.0 miles of roads. All are located within the deer winter range (MA-7) and scenic views (MA-9) land allocations of the LRMP. Roads proposed for closure are not needed for current management, but are likely to be needed for future activities. Roads proposed for decommissioning are not required for either current or potential future management activities.

Decommissioning has two definitions in the context of this project proposal. In the first definition, a decommissioned road is removed from the transportation system and is no longer considered a system road. Road signs are removed, maintenance is halted, and the road reverts back to a native state with or without mechanical treatments. In the second definition, the road is not only removed from the transportation system, but mechanical or other methods are used to make all or portions of the road unusable by motorized vehicles, including through the use of subsoiling. Unless otherwise noted, for the purposes of this project, a road recommended for decommissioning is removed from the transportation system only.

Roads would be closed using berms, gates, signing, and camouflaged using vegetation or native materials, or a combination of methods. Decommissioning would involve subsoiling or camouflaging with native vegetation and other materials that makes the road unusable by motorized vehicles. Decommissioned roads could be converted to other uses, including motorized and non-motorized trails at some point in the future and after additional environmental analysis and decisions.

## Planning Direction and Management Allocations

***Deschutes National Forest Land and Resource Management Plan***: The Deschutes National Forest Land and Resource Management Plan of 1990 (LRMP) as amended, provides guidance for management activities. The LRMP establishes goals, objectives, standards, and guidelines for each specific management area of the Forest, as well as Forest-wide standards and guidelines. The LRMP identifies four (4) main management area (MA) allocations within the planning area (Figure 1-2) - Deer Habitat (MA7), General Forest (MA-8), Scenic Views (MA-9), and Old Growth (MA-15). There is also a small area (44 acres) of the Special Interest Area (MA-1) allocation. No activities are proposed within the MA-1 allocation.

[1] Refer to the Transportation System section in Chapter 3 of this document for descriptions and definitions of these activities.

**Deer Habitat (MA-7):** Almost 89 percent (48,345 acres) of the planning area is designated by the LRMP as deer habitat land allocation. The remainder of the acreage is identified as summer range (6,278 acres). The LRMP has no summer range allocation for deer. There are no acres in the planning area identified as transitional range for deer. ***Desired Condition:*** The goal of this allocation is "To manage vegetation to provide optimum habitat conditions on deer winter and transition ranges while providing some domestic livestock forage, wood products, visual quality, and recreation opportunities." (LRMP page 4-113)."

**General Forest (MA-8):** This is the smallest of the four primary LRMP land allocations located within the planning area totaling approximately 932 acres or approximately 1.7 percent of the planning area acreage. ***Desired Condition:*** The goal is to emphasize timber production while providing forage production, visual quality and wildlife habitat, and recreational opportunities for public use and enjoyment (LRMP page 4-117).

**Scenic Views (MA-9):** Seven (7) percent, 3,616 acres, of the planning area is located within the Scenic Views land allocation of the LRMP. All of these acres are located on Pine Mountain. Approximately 822 acres are located in the foreground partial retention portion of the allocation and approximately 2,794 acres in the mid-ground partial retention portion. The majority is located on the north and northeast sides of the mountain overlooking US 20, Millican, and Forest Road 2017. The remainder is located on the south facing aspects below the Pine Mountain Observatory. ***Desired Condition:*** The LRMP identifies the goal for this allocation as "To provide Forest visitors with high quality scenery that represents the natural character of Central Oregon (LRMP page 4-121)." The desired condition for ponderosa pine in this allocation is to achieve and maintain a visual diversity through variations in both stand densities and size classes.

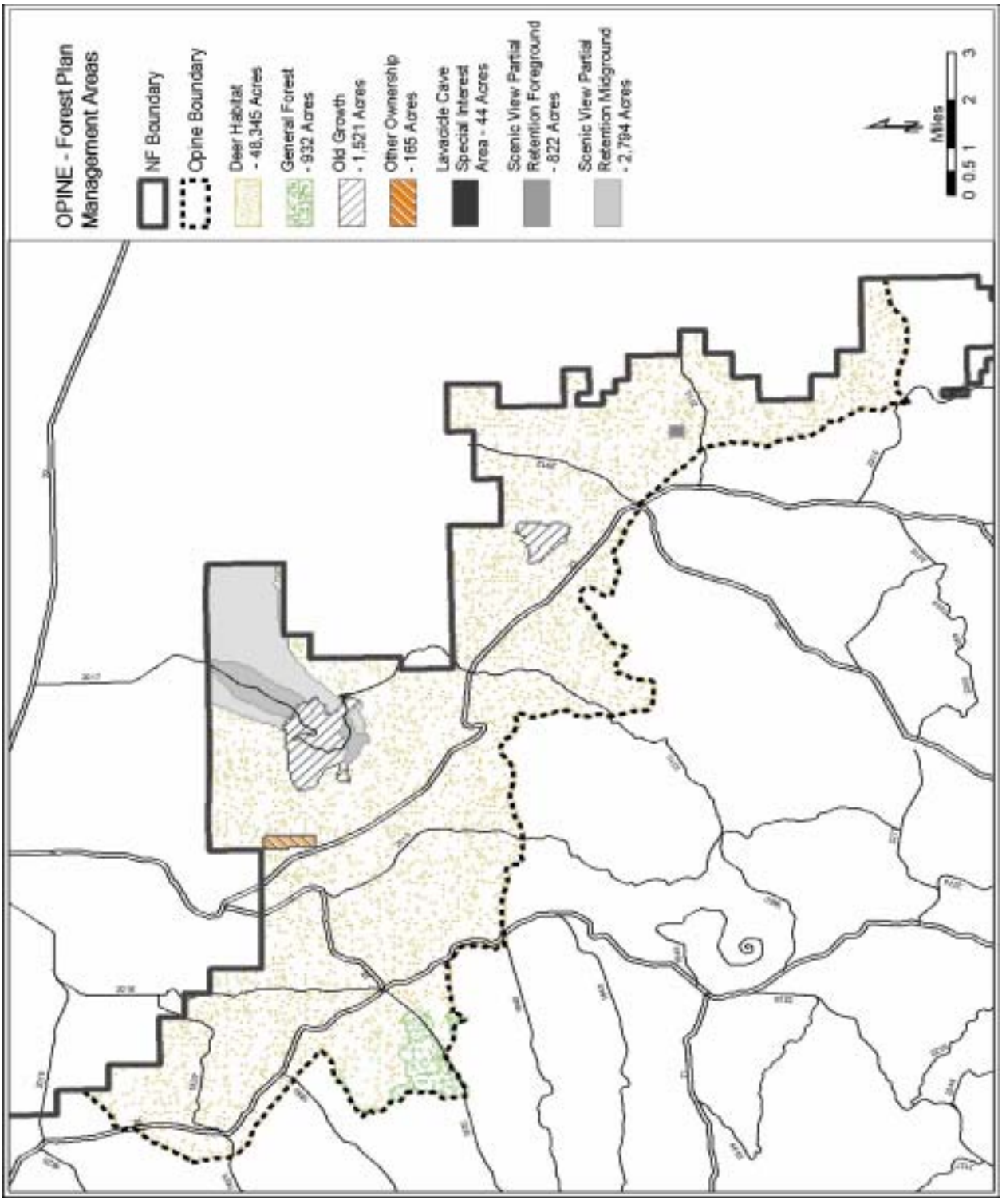
**Old Growth (MA-15):** Approximately 1,521 acres or approximately 2.8 percent of the planning area is located within the Old Growth Management Area (OGMA) allocation. There are two designated old growth management areas in the planning area; Pine Mountain and Pumice Springs. The former is representative of ponderosa pine; the latter, of dry lodgepole pine although it also includes dry ponderosa pine. ***Desired Condition:*** The goal for this allocation is "To provide natural evolved old growth forest ecosystems for (1) habitat for plant and animal species associated with old growth forest ecosystem, (2) representations of landscape ecology, (3) public enjoyment of large, old-tree environments, and (4) the needs of the public from an aesthetic spiritual sense." The objective of this allocation is to provide: 1) large trees; 2) abundant standing and downed trees; and 3) vertical structure except in lodgepole where a single canopy is common (LRMP page 4-149).

**LRMP Amendments (1995 and 2005)**

***Eastside Screens:*** The Revised Continuation of Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales, or Eastside Screens, amended the Forest Plan in 1995. It applies to the design and preparation of timber sales on eastside Forests, is often referred to as "Regional Forester's Forest Plan Amendment #2" or as the "Eastside Screens."

In 2005, the **Record of Decision** ***Northwest Preventing and Managing Invasive Plants Record of Decision*** signed. This amended the LRMP and provides Goals, Objectives, and Management Direction (Standards) for prevention and treatment of invasive plant species on National Forest Lands in Region 6, including the Deschutes National Forest. This direction was used to identify mitigation measures applicable to this project relative to the prevention and control of invasive species.

**Figure 1-2 Management Area Allocations - Opine Planning Area (source: Deschutes National Forest Land and Resource Management Plan).**



**Other Planning Direction and Strategies**

***Integrated Natural Fuels Management Strategy*** **-** The Deschutes National Forest "Integrated Natural Fuels Management Strategy (INFMS) (May, 1998) identifies several actions to address the impacts of fuel reduction activities on wildlife and wildlife habitat. It specifically proposes the establishment of winter range habitat units (WRHUs) as the "implementation unit" for assessing potential impacts and opportunities for mule deer (INFMS Executive Summary, page 27). WRHUs were identified in 1999 and updated in 2001.

On March 30, 2001 Forest Supervisor Leslie A.C. Weldon signed a Memorandum of Understanding between the USDA Forest Service, Deschutes National Forest, Bend-Fort Rock Ranger District and the Deschutes Watershed District of the High Desert Region of the Oregon Department of Fish and Wildlife to establish a process to implement an integrated natural fuels management strategy within mule deer winter range. This MOU, effective through December 31, 2006, implements the winter range habitat analysis process for WRHUs identified in the INFMS. This document substitutes WRHUs for the implementation units described in the LRMP when doing habitat analysis in mule deer habitat.

***Management Direction for Hazardous Fuels Reduction – All Land Allocations***

The National Fire Plan (2000 a & b) was developed with the intent of actively responding to severe wildland fires and their impacts to communities, while ensuring sufficient firefighting capacity for the future. It addresses five key points:

1) firefighting;
2) rehabilitation;
3) hazardous fuels reduction;
4) community assistance; and
5) accountability.

Among other things, it established an intensive, long-term hazardous fuels reduction program. Hazardous fuels reduction treatments are designed to reduce the risks of catastrophic wildland fire to people, communities, and natural resources while restoring forest and rangeland ecosystems to closely match their historical structure, function, diversity and dynamics. Treatments accomplish these goals by removing or modifying wildland fuels to reduce the potential for severe wildland fire behavior, lessen post-fire damage, and limit the spread or proliferation of invasive species and diseases.

In August 2001, the Secretaries of Agriculture and the Interior joined the Western Governors' Association of State Foresters, National Association of Counties, and the Intertribal Timber Council to endorse ***A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: A 10-Year Comprehensive Strategy.*** This strategy outlines a comprehensive approach to the management of wildland fire, hazardous fuels, and ecosystem restoration and rehabilitation. The primary goals of the strategy are to:

1) Improve prevention and suppression,
2) reduce hazardous fuels,
3) restore fire adapted ecosystems, and
4) promote community assistance.

The strategy also identifies a number of actions for each goal that include, in part, the following:

a) Reduce the total number of acres at risk to severe wildland fire,
b) Develop strategies to address fire-prone ecosystem problems that augment fire risk or threaten sustainability of these areas,
c) Assure maintenance of areas improved by fuels treatment by managing activities permitted on restored land to maintain their resiliency, and
d) Ensure local environmental conditions are factored into hazardous fuels treatment planning.

The strategy also identifies the following guiding principles for reducing hazardous fuels and restoring fire adapted ecosystems:

- ***Hazardous Fuel Reduction:*** Prioritize hazardous fuels reduction where the negative impacts of wildland fire are the greatest,
- ***Restoration:*** Restore healthy, diverse, and resilient ecological systems to minimize uncharacteristically severe fires on a priority watershed basis through long-term restoration.

The Implementation Plan (2002) for the strategy provides tools to deliver national goals at the local level in an ecologically, socially, and economically appropriate manner. Parties that endorsed the implementation plan agreed that to reduce the threat of wildland fire to people, communities, and ecosystems will require a number of actions, including but not limited to:

- management activities, both in the wildland-urban interface and in at-risk areas across the broader landscape; and
- active forest and rangeland management, including thinning that produces commercial or precommercial products, biomass removal and utilization, prescribed fire and other fuels reduction tools to simultaneously meet long-term ecological, economic, and community objectives.

***Invasive Plants (Including Noxious Weeds)*** Executive Order 13112 (invasive species) (1999) requires federal agencies whose actions may affect the status of invasive species to identify those actions and within budgetary limits, "(i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species… (iii) monitor invasive species populations… (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded;…(vi) promote public education on invasive species… and (3) not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species… unless, pursuant to guidelines that it has prescribed, the agency had determined and made public… that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions." The analysis incorporates the new Pacific Northwest Invasive Plant program measures into the project design.

In 2001, the ***USDA Forest Service Guide to Noxious Weed Prevention Practices*** was published. It discusses weed prevention practices that support Executive Order 13112. The goals and guidelines from this document were used to identify mitigation measures and other preventative measures necessary to prevent the introduction or spread of new and existing populations of noxious weeds and other invasive plants in this planning area.

In addition to the above documents and direction, the following provide additional management direction in the development and implementation of proposed actions on National Forest lands.

***The American Antiquities Act of 1906*****:** The American Antiquities makes it illegal to appropriate, excavate, injure, or destroy any historic, prehistoric ruin or monument, or any object of antiquity, situated on lands owned by the Government of the United States, without permission of the Secretary of the Department of the Government having jurisdiction over the lands on which said antiquities are situated.

***The National Historic Preservation Act of 1966, as amended:*** The National Historic Preservation Act requires federal agencies to consult with American Indian Tribes, state and local groups before nonrenewable cultural resources, such as archaeological and historic structures, are damaged or destroyed. Section 106 of this Act requires federal agencies to review the effects project proposals may have on cultural resources in the planning area.

***The Endangered Species Act of 1973, as amended:*** The Endangered Species Act is to "provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such tests as may be appropriate to achieve the purpose of the treaties and conventions set forth in subsection (a) of this section." The Act also states "It is further declared to be the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."

***The Migratory Bird Treaty Act of 1918:*** The Migratory Bird Treaty Act is to establish an international framework for the protection and conservation of migratory birds. The Act makes it illegal, unless permitted by regulations, to "pursue, hunt, take, capture, deliver for shipment, ship, cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, including in this Convention…for the protection of migratory birds…or any part, nest, or egg of any such bird" (16USC 703). The original 1918 statute implemented the 1916 Convention between the United States and Great Britain (for Canada). Later amendments implemented treaties between the Unites States and Mexico, Japan, and the Soviet Union (now Russia).

***The National Environmental Policy Act (NEPA) of 1969, as amended:*** The National Environmental Policy Act is "To declare a national policy which will encourage productive and enjoyable harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nations; and to establish a Council on Environmental Quality" (42 U.S.C. Sec. 4321). The law further states "it is the continuing policy of the Federal Government, in cooperation, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the present and future generations of Americans." This law essentially pertains to public participation, environmental analysis, and documentation.

The Council on Environmental Quality (CEQ) promulgated the regulations for implementing NEPA (40 CFR parts 1500-1508). The CEQ has recently provided guidance on considering past actions in cumulative effects analysis (Memo to Heads of Federal Agencies, June 24, 2005).

***The National Forest Management Act (NFMA) of 1976:*** The National Forest Management Act guides development and revision of National Forest Land Management Plans and has several sections to it ranging from required reporting that the Secretary must submit annually to Congress to preparation requirements for timber sale contracts. There are several important sections within the act, including Section 1 (purpose and principles), Section 19 (fish and wildlife resources), Section 23 (water and soil resources), and Section 27 (management requirements).

***The Clean Water Act, as amended in 1977 and 1982:*** The primary objective of The Clean Water Act is to restore and maintain the integrity of the Nation's waters. This objective translates into two fundamental national goals: 1. Eliminate the discharge of pollutants into the nation's waters; and 2. Achieve clean water quality levels for fishing and swimming. Under Section 303(d) of the Clean Water Act, the state has identified water quality-limited water bodies in Oregon. There are no water bodies in the planning area that are on the 303(d) list.

***The Clean Air Act, as amended in 1990:*** The purposes of The Clean Air Act are "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population; to initiate and accelerate a national research and development program to achieve the prevention and control of air pollution; to provide technical and financial

assistance to state and local governments in connection with the development and execution of their air pollution prevention and control programs; and to encourage and assist the development and operation of regional air pollution prevention and control programs."

***Multiple-Use Sustained-Yield Act of 1960:*** The Multiple Use – Sustained Yield Act of 1960 requires the Forest Service to manage National Forest System lands for multiple uses (including timber, recreation, fish and wildlife, range, and watershed). All renewable resources are to be managed in such a way that they are available for future generations. The harvesting and use of standing timber can be considered a short-term use of a renewable resource. As a renewable resource, trees can be re-established and grown in again if the productivity of the land is not impaired.

***Migratory Bird E.O. 13186:*** On January 10, 2001, President Clinton signed an Executive Order (E.O. 13186) titled "Responsibilities of Federal Agencies to Protect Migratory Birds." This E.O. requires the *"environmental analysis of federal actions, required by NEPA or other established environmental review processes, evaluates the effects of actions and agency plans on migratory birds, with emphasis on species of concern."*

***Riparian Habitat Conservation Areas (RHCA):*** The Inland Native Fish Strategy (**INFISH**, *1995*) provides criteria and guidance for delineation of Riparian Habitat Conservation Areas (RHCAs) for riparian-dependent resources to receive primary emphasis. These RHCAs include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems. These areas are to be managed to maintain or restore water quality, stream channel integrity, channel processes, sediment regimes, instream flows, diversity and productivity of plant communities in riparian zones, and riparian and aquatic habitats to foster unique genetic fish stocks that evolved within the specific region. **INFISH** does not apply in this planning area because there are no water bodies, wetlands, or other areas with aquatic ecosystems. **PACFISH** does not apply here because, historically, anadromous fish did not make it past Big Falls on the Deschutes River, more than 50 miles air miles northwest of the planning area.

## FOREST PLAN AMENDMENTS

**Proposed Site-Specific Forest Plan Amendments**

Three site specific, non-significant forest plan amendments are proposed. All three of the proposed amendments would apply to Alternative 2 and only the proposed second amendment for hiding cover would apply to Alternative 3.

**Amendment 1 (Alternative 2):** The first amendment would waive the thermal cover objective of 30 percent of the land area being in thermal cover within the deer winter range land allocation (MA-7). It would only apply to the MA-7 land allocation in the Opine Planning Area.

**Amendment 2 (Alternative 2 and 3):** The second amendment would waive S&G WL-54, which requires that 30 percent of the National Forest land within each ***Implementation Unit*** (IU) be in hiding cover. This amendment would be specific to the MA-9 and MA-15 land allocations on Pine Mountain located in IU #52 and the MA-15 allocation associated with the Pumice Springs OGMA in IU #57.

**Amendment 3 (Alternative 2):** This amendment addresses concerns with LOS and the Eastside Screens. Any of the units proposed for treatment that fall below the Historic Range of Variability would require a Forest Plan amendment to the screens. The third amendment would amend the Eastside Screens to permit regeneration harvest on 146 acres of black bark ponderosa pine and lodgepole pine stands to reduce the risk of loss due to insect and disease and to create structural diversity to improve deer hiding and thermal

cover. This amendment would be specific to units H19 and H28.

**Forest Plan Amendment Significance Factors**

Timing: The Forest Service Planning Handbook (1909.12, 5.32) indicates that a change is less likely to result in a significant plan amendment if the change is likely to take place after the plan period (the first decade). All three amendments would take place in the 16th year of the LRMP, would take place immediately, and are specific to this project. Additionally, the amendment to amend the Eastside Screens would take place in the 11th year after adoption of the Screens.

Location and Size: The first amendment is specific to the MA-7 land allocation within the Opine Planning Area and encompasses approximately 48,345 acres.

The second amendment is specific to deer summer range outside of the MA-7 land allocation. It is specific to the approximately 5,137 acres in the MA-9 and MA-15 (Scenic Views and Old Growth) land allocations in IUs #52 and #57 within the Opine Planning Area boundary.

The third amendment is specific to units H19, 38 acres of regeneration harvest in black bark ponderosa pine, and H28, 108 acres of regeneration shelterwood harvest in lodgepole LOS stages 4 to 6. Both units are located within the Opine Planning Area boundary.

Goals, Objectives and Outputs: None of three proposed amendments would alter the long-term relationship between levels of goods and services projected by the LRMP. None of the amendments change management allocations where programmable timber harvest could occur. There would not be any significant change in timber outputs over what might be available if the project was designed without the proposed amendments.

Management Prescriptions: None of the three amendments would change the desired future condition for land and resources from that contemplated by the existing management direction in the LRMP in the short-term. None of the three would affect the entire LRMP planning area. The first would affect only the 48,235 acres designated as MA-7; the second, only the 5,137 acres of MA-9 and MA-15 lands located within IUs #52 and #57 within the planning area boundary; and the third, only the 146 acres proposed for regeneration harvest in the Opine Planning Area. The proposed amendments would not change the LRMP allocations or management areas.

## DECISION TO BE MADE

Based on this environmental assessment, resource specialist's reports and biological evaluations, the Forest Supervisor, Deschutes National Forest, will decide:

- to implement the project as proposed or select one of the other alternatives for implementation.
- to amend the LRMP and Eastside Screens for the project.
- what mitigations and monitoring would be required.

## SCOPING AND PUBLIC INVOLVEMENT

Announcement of the proposed Opine project was included in the Central Oregon Schedule of Projects in the Winter 2002 edition and has been continuously published since that time. The Schedule of Projects (SOP) provides the status and descriptions of new, continuing, and completed projects. The SOP is posted to the Deschutes and Ochoco Forest Service website (www.fs.fed.us/r6/centraloregon/index.shtml) and mailed to approximately 90 individuals or groups.

The Opine Vegetation Management Environmental Assessment (EA) was originally scoped during March 2002 with other Opine planning area activities, including the Pine Mountain Observatory Master Plan EA that was analyzed and approved separately. The March 2002 scoping letter requesting public involvement was provided to 301 individuals, businesses, and organizations that have expressed an interest in the project development process. A supplemental scoping letter was mailed using the same mailing list which requested comments regarding proposed closures and decommissioning of existing system roads excess to current and future management needs. Included in both mailings was ***The Bulletin***, the local newspaper. Both letters were also mailed to the Confederated Tribes of the Warm Springs, the Burns Paiute, and The Klamath Tribes. Both letters were also posted on the Deschutes and Ochoco National Forests and Crooked River National Grassland internet website.

**30-Day Comment Period**
The Draft EA was made available for a 30-day public comment period September 14, 2005. This letter was sent to approximately 312 individuals, businesses, Tribes, and organizations that expressed an interest in the project and was placed on the Deschutes and Ochoco National Forests web site. The preferred alternative was identified. Comments were received from 33 respondents and were grouped into 57 comment groups. The summary of the comments and the response to those comments is located in Appendix D of the EA.

A number of respondents provided comments on off-highway vehicle use and management that was discussed in the 30 day comment version of the EA. The final Opine Vegetation Management does not address OHV management except where road closures/decommissioning and seasonal restriction are proposed to mitigate the impacts of thinning and fuel reduction treatments on wildlife habitat. Access and travel management actions, including OHV use and management, other than those described in this EA, will be analyzed separately.

## ISSUES

A total of 124 responses were received from over 100 individuals, agencies, and organizations from the two scoping letters. These comments can be found in the project files. The comments were grouped and formulated as issues and used in alternative design to develop mitigation measures, or are addressed under alternatives considered, but eliminated from detailed analysis or are addressed in the analysis of effect of actions. No comments were received from the Confederated Tribes of the Warm Springs, the Burns Paiute, or The Klamath Tribes.

Many of the public comments received were used to focus the analysis in areas where the public desired a specific resource to be addressed. All comments received have been assessed as to their relevance to each of the resources being addressed within the Opine planning area. Internal Forest Service comments and analysis were also used in the development of alternatives.

Many of the comments received were specific to off-highway vehicle (OHV) use on Pine Mountain and the proposal to establish a designated route system in that area. Decisions regarding the establishment of such a system and the development of other recreational trails on Pine Mountain are outside the scope of this analysis and were proposed for analysis under the separate Opine Access Management Environmental Assessment. That project was subsequently dropped. Information developed and received for that project may be used as part of the analysis for either the on-going travel management process that addresses motorized use across the Deschutes National Forest or any following site specific analyses that would analyze the establishment of a designated trail system in any or all parts of the planning area.

**Key Issues:** Key issues are issues used to develop alternatives or specific activities of the action alternatives and to compare alternatives. The following key issues and concerns were the basis for

designing an additional alternative other than the proposed action. Each key issue statement is followed by a more detailed explanation. Each key issue has a unit of measure developed for the reader to help distinguish between each alternative and how it responds to the issue. For a comparison of the alternatives see Chapter 2.

***Key Issue #1:*** **Effects on Mule Deer Habitat, which include: Vegetation Treatments; and Effects of Open Road and Motorized Trails on Habitat Effectiveness**

**Vegetation Treatments in Deer Habitat**

Approximately 89 percent of the Opine planning area is in the MA-7, deer winter range, land allocation of the LRMP. These acres are also identified as biological winter range for deer. The planning area is currently below LRMP standards and guidelines for both thermal and hiding cover. Existing forest stands that provide hiding and thermal cover lack structural diversity and contain tree stocking levels above the historic range of variability. Such stands are increasingly subject to insect infestation and increased wildfire severity and are not ecologically sustainable. Approximately 1/3$^{rd}$ of the planning area is in open, xeric shrublands. Shrubs, particularly bitterbrush provide critical winter mule deer forage in addition to providing nesting and foraging habitat for shrub-associated wildlife species. The desired condition for bitterbrush habitats in the planning area is to have a ratio of 1/3$^{rd}$ in early seral, 1/3$^{rd}$ in mid seral, and 1/3$^{rd}$ in late seral (late and decadent) habitats. Current bitterbrush habitats are dominated by late seral (late and decadent) habitats totaling 65 percent of the bitterbrush acreage. Early and mid seral conditions are found on 26 and 10 percent of the bitterbrush acres respectively.

- ***Measurement Standards:***
  - Percentage of hiding and thermal cover after treatment.
  - Bitterbrush age/structure ratios.

**Effects of Open Road and Motorized Trails on Habitat Effectiveness**

Habitat effectiveness is affected by open road and motorized trail density. The Opine planning area has a current average open road density of approximately 2.97 miles per square mile and a combined average road and motorized trail density of approximately 4.96 miles per square mile. Open road and motorized trail densities are reduced during the deer-hunting season through the Fox Butte Cooperative Travel Management Area program (Green Dot system) that reduces open road/motorized trail densities to approximately 2.92 miles per square mile. Target road densities range from 1.0 to 2.5 miles per square mile within designated deer habitat (M7-22, LRMP page 4-115) and 2.5 miles or less in other land allocations (WL-54 LRMP page 4-58).

Currently 25,976 acres of the planning area are closed to OHV use except on designated roads and trails (East Fort Rock OHV area). The remaining 28,647 acres are currently open to unrestricted motorized use including OHV use. Open roads and unrestricted off-road motorized vehicle use fragment wildlife habitat and disturb wildlife, especially during winter months when animals must use extra energy and resources to stay alive.

- ***Measurement Standard:***
  - Miles of system roads closed and decommissioned.
  - Road and motorized trail density.
  - Acres closed to unrestricted cross country motorized use.

***Key Issue #2:*** **Condition of Existing Vegetation**

Currently 10,645 acres, or approximately 29 percent of the forested acres, are rated at moderate to high for bark beetle risk. Of those acres 2,416 acres are rated as high for bark beetle risk based on canopy closures of 35 percent or higher. The remaining 8,229 acres have a moderate risk rating with canopy closures ranging from 25 to 35 percent. Bark beetles are currently present and causing mortality in

overstocked ponderosa pine stands near the Pine Mountain Observatory and the communication sites. Large diameter ponderosa pine in the Pine Mountain Old Growth Management area are showing signs of stress with many succumbing to stress and becoming susceptible to beetle attack. Many of the younger, black bark ponderosa pine stands in the Tepee Draw area in the western portion of the planning area have stocking levels that exceed upper management zone limits thereby making those stands at high risk for bark beetle outbreaks. Overstocked ponderosa pine stands in the Sand Springs area are also experiencing mortality associated with bark beetle activity.

- ***Measurement Standard:***
  - Number of acres treated that are rated as moderate to high risk for bark beetle attack.

***Key Issue #3:*** **Wildfire Risk**
Increasing forest stand and shrub community densities are contributing to an increased risk of high or extreme fire behavior potential due to increases in fuel loadings and the development of ladder fuels. Currently, 34 percent (18,491 acres) of the planning area is classified as either high (3,463 acres/six (6) percent) or extreme (15,028 acres/28 percent) for wildfire behavior potential.

Fire exclusion (fire suppression), lack of hazardous fuel treatment, and development of denser forest stands have increased fuel loadings above historic conditions. Fire starts historically in the project area have been lightning and human caused. With the rise in population growth in Central Oregon the risk of fire starts from high public use are predicted to increase. The combination of higher fuel loadings and risk of increased fire starts creates the potential for high intensity, stand replacing fire behavior. Should a fire start, go undetected and a wildfire occur, forest health, wildlife habitat, soils, water quality, recreational values and the safety of public and fire fighters could be negatively affected.

- ***Measurement Standard:***
  - Number of acres treated that are rated as moderate to extreme fire behavior potential

## Analysis Issues

The following issues or concerns listed (identified by the ID Team, through the scoping process, and 30-day comment period) were identified and have been tracked through the analysis.

**Fire and Fuels**
Fire and Fuels effects will analyze and compare by alternative: Defensible Space/Safety Corridors and Access.

**Air Quality**
Alternatives 2 and 3 include underburning and pile burning activities for treating fuels and related harvest operations. Bend is a Designated Area with a high population and air quality concern and located approximately 20 miles southwest from the Opine project area. The City of Bend is closely monitored for smoke intrusion and effects from prescribed fire.

Pile burning would comply with the Clean Air Act and would be coordinated with the Oregon State Department of Environmental Quality and Oregon State Department of Forestry. All burning would be in compliance with state smoke management plans. Underburning would only be completed and landing piles would only be ignited under prescribed conditions.

Effects of the alternatives on air quality will be measured by the emissions expected.

**Botany**
A biological evaluation is documented in the Botany Report (Project Record). The current condition and expected environmental effects on Threatened, Endangered, or Sensitive plant species, as described in the Botany Report, is summarized and described in Chapter 3. The report is incorporated by reference in the Project Record.

**Noxious Weeds**
The planning area contains populations of noxious weeds. Design elements aimed at preventing the spread of noxious weeds are incorporated into the action alternatives. The effects of the alternatives on noxious weeds are described in Chapter 3 of the EA.

**Heritage Resources**
Proposed activities will have no effect on cultural resources. All sites are being avoided. The effects of the alternatives on heritage resources are described in Chapter 3 of the EA.

**Off-Highway Vehicle (OHV)**
Comments were received related to off-highway vehicle use. The area currently receives OHV use and levels of use are expected to increase regardless of the alternative selected. The Opine planning area has been used for both casual and competitive OHV activities. The socio-economic effects of decommissioning of motorized routes will be discussed in Chapter 3 under Off Highway Vehicle (OHV).

**Range**
The effect of the treatments for the proposed and connected actions related to the grazing allotments is described in Chapter 3 of the EA.

**Recreation**
Several comments were received in response to 30 day Notice and Comment expressing concern over proposed road management, specifically against any road closures that would reduce access for motorized recreational pursuits.

The road management actions are intended to aid in the deer habitat concerns and are part of the mitigation measures identified in the wildlife discussion. Road management proposed actions have been identified as a result of an interdisciplinary road analysis for the Opine area. The proposed road management includes actions to implement road strategies identified in the road analysis for existing roads.

The effects of the alternatives on recreation are measured by describing changes to the recreation experience. Recreational experience based on reduced access for motorized recreational pursuits are discussed under Off-Highway Vehicle (OHV)

**Scenic**
The effect of the proposed action and connected actions related to the scenic concerns are described in Chapter 3 of the EA.

**Silviculture**
Silviculture effects will be disclosed under Key Issue #2: Condition of Existing Vegetation in Chapter 3. Effects of treatments related to fuels will be disclosed under Fire and Fuels.

**Soils**
The long-term sustainability of forest ecosystems depends on the productivity and hydrological functioning of soils. Ground-disturbing management activities directly affect soil properties, which may adversely change the natural capability of soils and their potential responses to use and management. The effects of the alternatives on soils are described in Chapter 3 of the EA.

**Economic and Social Analysis**
Consideration must be given to the financial efficiency of the proposed action and alternatives. Economic and social analysis focuses on the communities of Central Oregon and their ties to forest management through employment, income, recreation, fuelwood, and sport. The effects of the alternatives on economical and social are described in Chapter 3 of the EA.

**Civil Rights and Environmental Justice**
Civil Rights legislation and Executive Order 12898 (Environmental Justice) direct an analysis of the proposed alternatives as they relate to specific subsets of the American population. The subsets of the general population include ethnic minorities, people with disabilities, and low-income groups. The effects of the alternatives on civil rights and environmental justice are described in Chapter 3 of the EA.

**Wildlife**
In addition to the Effects on Mule Deer Habitat key issue, the following items are analyzed and effects compared by alternative:

- **Connectivity and Fragmentation;**
- **Summary of Wildlife Species / Management Indicator Species;**
- **Snags, Green Tree Replacements (GTRs) and Coarse Woody Material (CWM) Habitat;**
- **Special/Unique Habitats;**
- **Ecological Indicator Species/Habitats and Focal Species (Landbirds);**
- **Proposed Endangered, Threatened, and Sensitive (PETS) Wildlife Species** There are no known Threatened or Endangered species present within the planning area boundaries. There are plant and animal species listed as sensitive on the Region 6 Regional Forester's Sensitive Species List present within the planning area. The effects on these species are analyzed and compared by alternative; and
- **Resident and Migratory Landbirds**.

## Issues Not Addressed in Detail

Issues or concerns that were either already addressed through alternative design or mitigation, are not affected by the proposed actions, or are beyond the scope of this project. These resource areas are not discussed further in this analysis.

**Northwest Forest Plan**
The planning area lies outside the area of the Northwest Forest Plan (NWFP) boundaries.

**Wilderness/Roadless Characteristics**
There are no Inventoried Roadless Areas or unroaded characteristics within or adjacent to the planning area boundaries. The nearest such area is associated with the Newberry National Volcanic Monument, approximately six (6) to 10 air miles west and southwest of the planning area. The project area is heavily roaded with existing roads and motorized trails. There is no designated wilderness within or adjacent to the project area. The nearest wilderness boundary is the Three Sisters Wilderness, approximately 40 miles to the west.

**Wild and Scenic River/Essential Fish Habitat**

There are no wild and scenic river corridors within or adjacent to the project area. The Deschutes Wild and Scenic River is approximately 17 air miles due west from the project area. There are no perennial streams, lakes, or other permanent water bodies within the planning area boundary. There is no essential fish habitat or potential bull trout habitat within 17 miles of the project area.

**Water Quality**

There would be no flow impacts to the Deschutes Basin, based on the existing condition of no streams within or adjacent to the project area and the soils that allow for rapid infiltration of precipitation without the potential overland flow reaching perennial stream channels. Any channeled surface flows within ephemeral channels are discontinuous and travel short distances.

# CHAPTER 2 - ALTERNATIVES DESCRIPTIONS

## INTRODUCTION

This section provides discussion of a No Action Alternative and the action alternative developed in response to public comments. It also includes a brief discussion of alternatives that were considered and responds to why they were eliminated from further analysis. This chapter also includes a comparison of all of the alternatives, including the proposed action. The discussion includes a summary of the effects of each alternative. Mileage, acreage, and volume values used throughout this section are approximate.

## ALTERNATIVES CONSIDERED IN DETAIL

This section provides a description of the alternatives responding to the "Purpose and Need" that are considered to be reasonable and viable by the Decision Maker (the Deschutes National Forest Supervisor). Alternatives are designed to move towards the desired condition that is consistent with the standards and guidelines of the Forest Plan.

**Alternative 1 (No Action)** This alternative provides a baseline that compares relative changes and their effects that would occur with implementation of projected activities in either Alternative 2 (Proposed Action) or Alternative 3.

Under this alternative, no vegetation treatments would be implemented to reduce stocking levels and reduce the risk of bark beetle attack. Dense stands would not be thinned to maintain or improve individual tree and stand health and vigor. No regeneration harvest or planting would be implemented to increase structural diversity, improve cover for wildlife, or to reduce light pollution and provide additional screening at the Pine Mountain Observatory. No trapping of gophers or tubing of seedlings would be required in either the regeneration units or within the observatory special use permit area.

Approximately 300 trees, currently affecting lower night sky views from the three telescopes at the Pine Mountain Observatory would not be removed.

No temporary roads would be constructed. No miles of open system roads would be closed or decommissioned. Open road and motorized trail densities are reduced during the deer-hunting season through the Fox Butte Cooperative Travel Management Area program (Green Dot system) that reduces open road/motorized trail densities to approximately 2.92 miles per square mile within the Opine Planning Area. National Forest lands outside the boundaries of the East Fort Rock OHV trail system area would remain open to cross-country motorized use. Motorized use, including OHV use, on existing roads would continue under existing rules, laws, and regulations.

No acres would be subsoiled to restore soil productivity and reduce existing levels of detrimental soil impacts.

No fuel reduction treatments would be implemented. No densely stocked stands of trees would be thinned to reduce ladder fuels and the risk of high or extreme fire behavior and the risk of crown fires. No areas occupied by xeric shrubs would be mowed to reduce the risk of high or extreme fire behavior. No strategic fuel breaks would be established to provide safe egress for fire crews and the public and to protect other resources, structures, and improvements.

No firelines would be constructed; no rehabilitation would be required.

No forest plan amendments would be required. Thermal and hiding cover levels would remain at current levels.

## Alternative 2 (Proposed Action)

This alternative would authorize the treatment of 6,468 acres of forest stands by commercial and non-commercial harvest to reduce stand densities, reduce the risk of a large scale bark beetle attack, and reduce fuel loadings. This includes 146 acres of regeneration harvest including 38 acres of clearcut harvest in black bark ponderosa pine to reduce the incidence and spread of dwarf mistletoe and 108 acres of shelterwood regeneration harvest in low vigor lodgepole pine to restock those acres with younger, more vigorous trees and reduce the likelihood of insect attack. The remainder of the 6,468 acres treated includes commercial thinning (trees between eight (8) and 21 inches dbh) on 1,620 acres; 2,355 acres of commercial thinning with follow-up non-commercial thinning (trees generally less than eight (8) inches dbh) of the residual understory; and non-commercial thinning of 2,347 acres.

Removal of small diameter material –posts, poles, biomass, and other solid wood fiber from non-commercial harvest units may be permitted if economic conditions permit. Commercial harvest would not remove any trees 21 inches dbh or larger for other than safety considerations. Within the treated commercial and non-commercial harvest units 5,312 acres of non-harvest related fuel reduction accomplished by a combination of underburning (3,704 acres) and burning beneath the tree dripline (1,608 acres). Additionally, Alternative 2 includes 20,170 acres of fuel reduction treatments in xeric shrublands and forest stands.

The proposed action includes the following activities:

**Commercial Thinning Units**

- Thin to create or maintain single story stands and culture large trees (1,620 acres);
- Thin to reduce stand competition, culture large trees and retain a combination of single story and multi-story canopy (2,355 acres);

**Regeneration Harvest Units**

- Regeneration clearcut harvest to reduce the incidence and spread of dwarf mistletoe in ponderosa pine (38 acre);
- Regeneration shelterwood harvest to reduce incidence of insects in lodgepole pine (108 acres);

**Non-Commercial Thinning Units**

- Thin to reduce stand competition, culture large trees and retain a single story canopy (2,347 acres);

***Total: 6,468 acres***

**Fuels Reduction in Commercial Units**

- Fuels Reduction units underburning (1,702 acres);
- Fuels Reduction units with burning beneath the tree dripline (1,323);

**Fuels Reduction in Non-Commercial Units**

- Fuels Reduction units underburning (2,002 acres)
- Fuels Reduction with burning beneath the tree dripline (285 acres)

***Total: 5,312 acres*** Fuels Reduction within Commercial and Non-Commercial Treatments

**Fuels Reduction in Xeric Shrublands and Forest Stands Units**

- Underburning (5,299 acres);
- Burning beneath the tree dripline (2,064 acres) ;
- Pretreat (cut trees less than 4 inches dbh with follow-up underburn) and Underburn (9,553 acres);
- Pretreat, Machine Pile, Burn Piles, and Mow (147 acres);

- Pretreat, Machine Pile, Burn Piles, & Underburn (2,140 acres);
- Pretreat, Mow, & Underburn (307 acres);
- Hand Fall or Mow Juniper 9 inches dbh and less (335 acres);
- Hand Fall or Mow Juniper 9 inches dbh and less , Mow, Underburn (133 acres);
- Mow (192 acres).

***Total: 20,170 acres***

**Connected Actions**
In order for the Proposed Action to be implemented, the following connected actions would also need to be implemented[2]:

- Of the 19 miles of currently opened system roads, approximately 3 miles would be closed following project activities. Approximately 16 miles of system roads would be decommissioned by subsoiling (removed from the transportation system) to mitigate the effects of vegetation and fuel reduction treatments on wildlife habitat, particularly to reduce the effects of reductions in hiding and thermal cover and to reduce habitat fragmentation.
- To facilitate timber harvest, road maintenance to apply clay or crushed aggregate to surface on about 30 miles of roads.
- To facilitate timber harvest, road maintenance, especially blading, brushing, and shaping would be performed on about 8.0 miles of roads.
- About 1.05 miles of temporary roads would be constructed to facilitate economical timber harvest and obliterated/subsoiled upon completion of harvest activities.
- Tree planting on 49.25 acres, which are for the 38 acre regeneration clearcut and 11.25 acres of pre-existing openings.

**Proposed Forest Plan Amendments**
Three site specific, non-significant forest plan amendments are proposed for Alternative 2.

**Amendment 1:** The first amendment would waive the thermal cover objective of 30 percent of the land area being in thermal cover within the deer winter range land allocation (MA-7). It would only apply to the MA-7 land allocation in the Opine Planning Area.

**Amendment 2:** The second amendment would waive S&G WL-54, which requires that 30 percent of the National Forest land within each ***Implementation Unit*** (IU) be in hiding cover. This amendment would be specific to the MA-9 and MA-15 land allocations on Pine Mountain located in IU #52 and the MA-15 allocation associated with the Pumice Springs Old Growth Management Area (OGMA) in IU #57.

**Amendment 3:** This amendment addresses concerns with LOS and the Eastside Screens. Any of the units proposed for treatment that fall below the Historic Range of Variability would require a Forest Plan amendment to the screens. The third amendment would amend the Eastside Screens to permit regeneration harvest on 146 acres of black bark ponderosa pine and lodgepole pine stands to reduce the risk of loss due to insect and disease and to create structural diversity to improve deer hiding and thermal cover. This amendment would be specific to units H19 and H28.

**Commercial and Non-Commercial Harvest Slash Treatments**
Commercial harvest activities, both thinning and regeneration harvest, would include the use of ground based equipment. Skidders would operate on designated skid trails spaced on average of 100 feet apart and would be required to remain on those trails and, when necessary, to pull line up to 75 feet to reach

[2] Refer to the Transportation System section in Chapter 3 of this document for descriptions and definitions of these activities.

felled trees located away and/or bunched away from the skid trail. Harvesters would be permitted off designated skid trails to harvest and bunch trees. They would be expected to make a maximum of two (2) passes on each travel route.

To reduce slash treatment within commercial harvest units, all felled trees would be skidded to the landing with tops attached. Slash on the landing would be piled and burned. Of the 6,468 acres treated by commercial and non commercial harvest operations, approximately 5,984 acres of slash would be treated by lopping and scattering using hand tools including chain saws. No post-harvest slash treatment would be applied on 338 acres. The 146 acres of regeneration harvest would have the slash tractor piled and burned.

Burning beneath the tree dripline of residual trees to reduce non-harvest fuels would be accomplished on 1,608 acres. The remaining 3,704 acres of fuel reduction treatments would be underburned.

Thirty-eight (38) acres of regeneration clearcut harvest would be planted after harvest. All planting would be by hand at an approximate 12 foot by 12 foot (12x12) spacing (300 trees per acre). Planted seedlings would be protected from animal damage by vexar-type tubing. Incidental site preparation to clear residual vegetation and/or slash may be required in some areas. Such planting may require localized site preparation to clear away regenerating vegetation using hand tools.

Planting would occur between the existing researcher's quarters and Road 2017 to at least partially replace vegetation lost due to the construction and to screen new facilities from the road. Approximately one quarter (0.25) acre within the Pine Mountain Observatory permit boundary would be planted with approximately 160 ponderosa pine seedlings (8x8 foot spacing). It would also provide additional screening of buildings from the road, reduce light pollution from vehicles, reduce noise from the road, campground and new parking area, and provide an additional buffer to reduce dust. Planting and site prep methods and tools would be the same as previously described. The seedlings would be tubed to protect them from browsing by wildlife.

The 108 regeneration shelterwood harvest acres would be regenerated to lodgepole pine using natural regeneration with seed provided by the residual overstory trees. If the resulting understory stands did not meet stocking standards after five (5) years, they would be planted with lodgepole pine seedlings to bring stocking levels up to required standards. Such planting may require localized site preparation to clear away regenerating vegetation using hand tools.

Approximately 11 acres of small openings contained within unit H23, a 43 acre proposed commercial thinning unit, are proposed for planting to improve structural diversity and provide additional future hiding cover. The openings, created prior to the acquisition of the land by the Forest Service during the 1930s, would be planted with ponderosa pine at a stocking of approximately 300 trees per acre (12x12 foot spacing). Planting and necessary site prep would be as described above. To minimize animal damage from browsing by wildlife, the seedlings would be protected with vexar-type tubing.

Commercial harvest activity would require the construction of approximately one (1.05) mile of temporary roads to access units H17, H18, H19, and H42. These roads would be obliterated upon completion of harvest activities using a tractor pulling a winged subsoiler. Subsoiling would be to a maximum depth of 24 inches.

Subsoiling would be implemented on approximately 59 acres within vegetation treatment units to reduce detrimental soil impacts (compaction) associated with harvest acres or to obliterate and decommission system road segments within those units upon completion of management activities. Seven (7) units; H02, H07, H19, H36, H38, H40, and H41, are projected to have detrimental soil impacts that exceed 20

percent of the unit area upon completion of harvest activities and/or machine piling of slash (unit H19). Three (3) of those units; H07, H38, and H41, currently exceed the 20 percent detrimental soil standard (Table 3-4, Soils Report). Thirty-three (33) acres would be subsoiled to reduce detrimental soil impacts to or below the 20 percent standard, or in the case of the three units that currently exceed the standard, to a level below the existing level. Subsoiling would be accomplished using a D6 or comparable crawler tractor pulling a winged subsoiler to a maximum depth of 24 inches.

Units H10, H23, and H28 are also proposed for subsoiling even though post-harvest detrimental soil impacts are not projected to exceed the 20 percent standard (Table 3-4, Soils Report). Approximately two (2) acres would be subsoiled in units H10 and H23, primarily to obliterate and decommission system roads. Approximately 14 acres would be subsoiled in unit H28 to rehabilitate logging facilities (skid trails and landings) following shelterwood harvest in unit H28. In thinning units these facilities would be retained for future use; no such use is expected in unit H28 in the next 30 years.

Non-commercial harvest could be accomplished with either the use of the same or similar types of mechanized equipment to fall and remove the material if commercial markets develop for some or all of the material or by hand felling and leaving on site. Where mechanized equipment was not used, all felling would be accomplished by hand using chain saws. Mechanized equipment would not be used in units P1 and P2.

Assuming that machinery is utilized to harvest small diameter trees, two (2) additional units; P04 and P19, are projected to exceed the 20 percent standard upon completion of management activities. P04 currently exceeds the 20 percent standard; P19 does not (Table 3-4, Soils Report). A total of 10 acres would be subsoiled to reduce detrimental impacts. In unit P19, subsoiling would reduce the level of detrimental impacts to 20 percent. In Unit P04, subsoiling would reduce the level of detrimental soil impact to 23 percent or two (2) percent below current levels.

**Fuels Reduction Treatments in Xeric Shrublands and Forest Stands (20,170 acres)**
This alternative also proposes fuel reduction treatments on an additional 20,170 acres. Proposed treatments would reduce the risk of a wildfire damaging or destroying structures at the Pine Mountain Observatory, the facilities at the Antelope and Pine Mountain electronic sites, and the Bonneville Power Administration (BPA) substation in the Sand Springs Area. Treatments along Roads 18, 23, and 2017, major travel routes within the planning area, would improve safety for visitors and firefighters entering and leaving the planning area. All treatments would reduce fuel loadings and break up vertical and horizontal fuels, reducing the risk of crown fires as well as the risk of a large scale, high intensity wildfire fire adversely affecting other resource values including wildlife habitat and cultural resources.

A total of 9,553 acres would include pretreating by the falling of all trees four (4) inches dbh and smaller using chain saws and then underburning. Ignition would be by hand.

A total of 147 acres (units F28, F29, F31, and F40) along Roads 18 and 23 would be pretreated by felling all trees four (4) inches dbh and smaller followed by machine piling the slash in random locations using a ground based tractor with a brush rake. All piles would be burned and residual vegetation mowed. Vegetation height after mowing would be at least six to eight (6 to 8) inches in height. These units are all located along primary travel routes and would help to provide safe travel routes.

A total of 2,140 acres would be pretreated by falling all trees less than four (4) inches dbh followed by machine piling, burning of the piles, and underburning. No hand or machine fireline would be constructed.

A total of 335 acres (units R2A, R2B, R3Aeast and R3Awest) would have juniper trees nine (9) inches dbh and smaller felled. Slash would be lopped and scattered and left on site. No burning or mowing would follow.

A total of 133 acres (unit R1B) would be treated by a combination of mowing and underburning to reduce fuel loadings associated with high shrub densities, particularly manzanita. Mowing would be limited to slopes of 25 percent or less on approximately 88 acres. Slopes over 25 percent, approximately 45 acres, would be treated by underburning.

A total of 307 acres would be pretreated by felling all trees less than four (4) inches dbh. Residual understory vegetation would be mowed using the equipment and standards described previously. This would be followed by underburning.

Mowing only would reduce fuel loadings on 192 acres.

Underburning without additional treatments would be utilized on 5,299 acres. Unit R1A, 39 acres of the 5,299 acres would have prescribed fire applied to reduce fuel loadings associated with high shrub densities.

Underburning beneath the dripline of residual trees would be done on 2,064 acres.

Two and one half (2.5) miles of machine fireline (units F01, F07, F18, F38, and F39) would be required to reduce the potential of fire escaping and burning in areas not proposed for burning. Roads, trails, other physical features, and the laying of hoses would be used as firelines in lieu of constructed lines on the remainder of these units and in other fuel treatment units. Machine fireline would be constructed using an all season tracked vehicle (or comparable) with a straight blade. All vegetation would be removed down to mineral soil. Width of the machine line would be approximately three (3) feet.

No hand fireline construction is planned under this alternative. Small segments of hand fireline may be necessary in some units where slopes exceed 30 percent and machine use is prohibited or restricted. Hand fireline would be constructed using hand tools and clearing all vegetation down to mineral soil within a strip approximately 18 to 24 inches wide.

All fireline would be rehabilitated upon completion of prescribed burning activities by redistributing displaced topsoil and slash materials including unburned vegetation and woody debris over the line. This would reduce erosion and restrict or prohibit access by motorized and mechanized vehicles.

Table 2-1 contains a description of the types of activities and their specific proposed locations (see map following table) across the landscape. The process used to strategically locate these units is based on field surveys and specialist input.

Vegetation treatments are projected to result in the production of approximately 11,568 cunits (1 cunit = 100 cubic feet) or approximately 5.9 million board feet of solid wood fiber.

**Table 2-1 Proposed Treatments by Unit - Alternative 2**

| TREATMENT TYPE | UNIT NUMBER[3] | ACRES[4] |
|---|---|---|
| **VEGETATION TREATMENTS** | | |
| Commercial and non commercial units identified by type of treatment and were located to strategically reduce fuel loadings and forest vegetation density so as to lessen the risk that disturbance events such as insect, disease, and wildfire which may lead to large-scale loss of forest. Commercial harvest treatments would contribute to the local and regional economies by providing timber and other wood fiber products. See map in Chapter 2 for unit locations. | | |
| **Small and Medium Tree Harvest (Trees to 21 inches dbh)** | | |
| **Commercial Harvest** | **H01, HO5-07, H13-14, H17, H20, H22, H24, H27, H29, H31-32, H36, H39, H42** | **1,620** |
| **W/Subsoiling** | **H07, H36** | **3[5]** |
| **Slash Treatment** | | |
| **Lop & Scatter** | **H05, H14, H17, H20, H22, H24,H27, H29, H31-32, H36, H39, H42** | **(1,468)** |
| **None** | **H01, HO6, H07, H13** | **(152)** |
| **Fuel Treatment** | | |
| **W/Underburning** | **H01, H05-07, H14, H20, H22, H42** | **(794)** |
| **W/Burning Beneath the Dripline** | **H13, H17, H24, H27, H31-32, H36, H39** | **(691)** |
| | | |
| **Commercial Harvest w/ Non-Commercial Harvest** | **H02-04, H08-12, H15, H16, H18, H21, H23, H25-26, H30, H33-35, H37-38, H40-41** | **2,355** |
| **Subsoiling** | **H02, H10, H23, H38, H40, H41** | **24** |
| **Slash Treatment** | | |
| **Lop & Scatter** | **H03-04, H08-11, H15, H16, H18, H21, H23, H25-26, H30, H33-35, H37-38, H40-41** | **(2,329)** |
| **Machine Pile & Burn** | **H23** | **(43)** |
| **None** | **H02, H12,** | **175** |
| **W/Planting** | **H-23 (**planting in thinning unit to improve structural diversity and provide additional future hiding cover**)** | **11** |
| **Fuel Treatment** | | |
| **W/Underburning** | **H02-04, H08-11, H15, H21** | **908** |
| **W/Burning Beneath the Dripline** | **H12, H16, H18, H25-26, H35, H38, H40-41** | **632** |
| | | |
| **Regeneration Harvest** | **H19 (clearcut), H28 (shelterwood)** | **146** |
| **W/Subsoiling** | **H19, H28** | **22** |
| **Slash Treatment – Machine Pile & Burn** | **H19, H28** | **(146)** |
| **W/Planting** | **H19** | **(38)** |
| **W/Natural Regeneration** | **H28** | **(108)** |
| | | |
| **Non-Commercial thin with scattered Small Tree (Trees to 16 inches dbh)** [6] | | |
| **Non-Commercial Harvest** | **P01-22, SD01-08** | **2,347** |
| **W/Subsoiling** | **P04, P19** | **10** |
| **Slash Treatment – Lop & Scatter** | **P01-22, SD01-08** | **2,347** |
| **Fuel Treatment** | | |

[3] H – Commercial harvest unit (trees generally 8-21 inches dbh).. P – Non-commercial thin unit (trees generally less than 8 inches dbh). SD – Harvest unit dominated by trees generally less than 8 inches dbh, but with scattered larger trees up to 16 inches dbh. F – Shrub fuel treatment unit.

[4] Acres are gross unit acres. Actual treatment acres are variable within treatment units. Ten (10) percent of vegetation and fuel treatment units would remain in untreated blocks within the unit. Fuel reduction units, particularly units treated by mowing or prescribe fire would result in a mosaic pattern of treatment across the entire unit so the actual number of acres untreated is expected to be higher.

[5] Acres listed are the total number of acres estimated to be subsoiled within the listed treatment units. Table 3-4 in the Soils Report identifies the estimated number of acres to be subsoiled within each unit.

[6] Commercial size trees greater than 8 inches dbh are few and would not be considered a commercial product due to low volume per acre unless biomass or fiber markets improved.

| TREATMENT TYPE | UNIT NUMBER[3] | ACRES[4] |
|---|---|---|
| W/Underburning | P03-18, P22, SD01-06, SD08 | 2,002 |
| W/Burning Beneath the Dripline | P19, P21, SD07 | 285 |
| | | |
| SUBTOTAL[7] | | 6,468 |
| | | |
| Fuel Reduction Treatments in Xeric Shrublands and Forest Stands | | |
| Pretreat[8] & Underburn | F01, F04-06, F09-11, F15, F17, F21-23, F30, F34, F36-38 | 9,553 |
| Pretreat, Machine Pile, Burn Piles, & Mow | F28-29, F31, F40 | 147 |
| Pretreat, Machine Pile, Burn Piles, & Underburn | F20 | 2,140 |
| Pretreat, Mow, & Underburn | F14, F16, F35, F41 | 307 |
| Hand Fall or Mow Juniper 9 inches dbh & less | R2A, R2B, R3Aeast, R3Awest | 335 |
| Hand Fall or Mow Juniper 9 inches dbh & less , Mow, Underburn | R1B | 133 |
| Mow | F08, F19, F33 | 192 |
| Underburn | F02-03, F07, F12-13, F18, F24, F39, R1A | 5,299 |
| Underburn Beneath Tree Dripline | F25-27, F32 | 2,064 |
| | | |
| SUBTOTAL | | 20,170 |
| | | |
| TOTAL[9] | | 26,830 |

Figures 1-4a through 1-4c and 1-4a through 1-4c display the location of the proposed vegetation and fuel reduction treatment units for this alternative.

[7] This total is calculated by adding the number of acres proposed for commercial and non-commercial harvest (including regeneration harvest) only.
[8] Pretreat or pretreatment refers to the cutting of trees four (4) inches dbh and smaller prior to other follow-up fuel reduction activities such as mowing or prescribe fire.
[9] This figure is a sum of the vegetation, fuel reduction, and range/sage-grouse enhancement acres. It also does not include the figures in parentheses as these figures are subsets of the primary activity acreage. The combination vegetation and fuel reduction treatment acres are included as part of the vegetation acres and therefore not included here.

**Figure 1-4a Vegetation Treatment Units Tepee Draw- Alternative 2.**

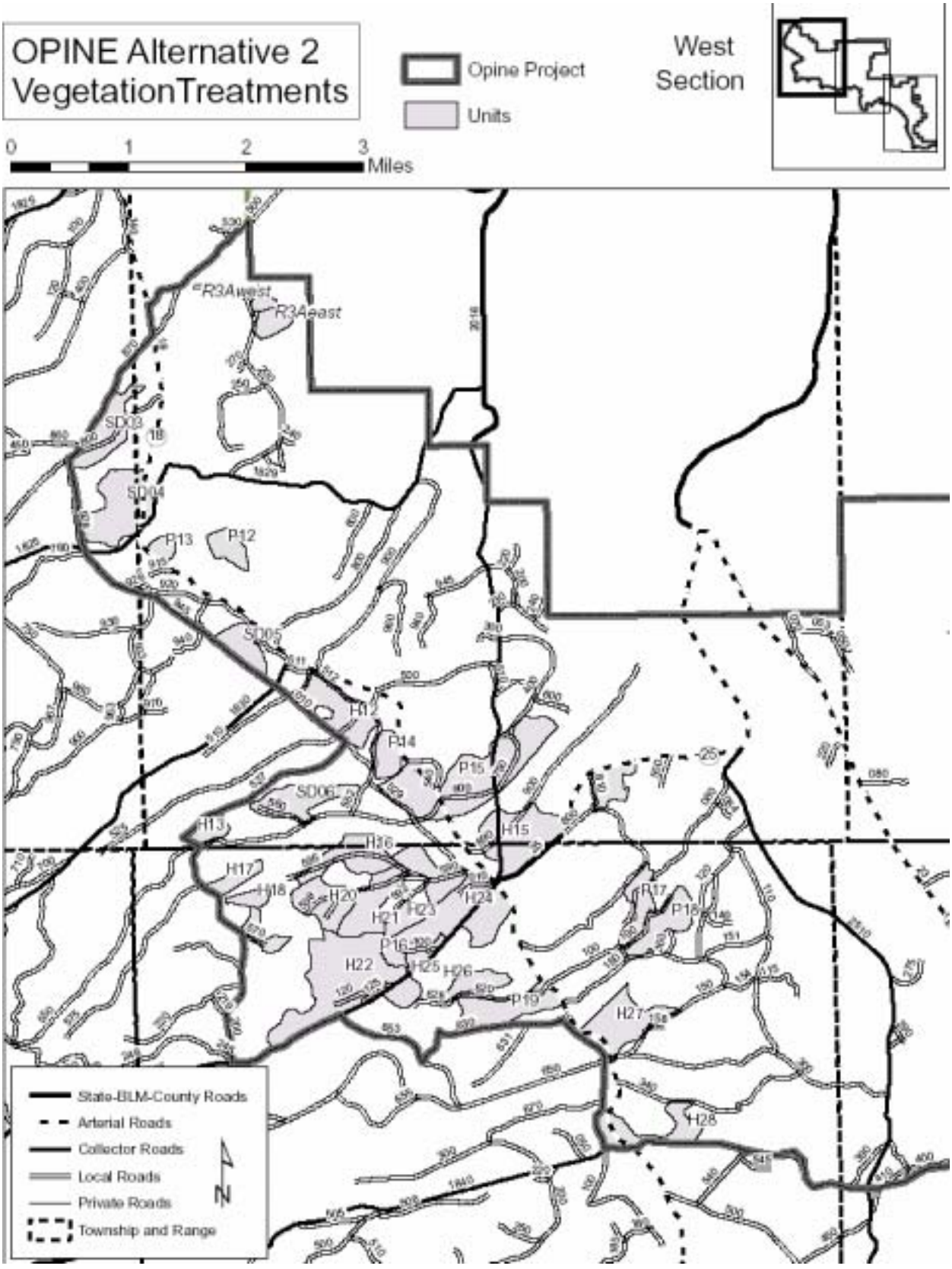


**Figure 1-4b Vegetation Treatment Units Pine Mountain - Alternative 2**

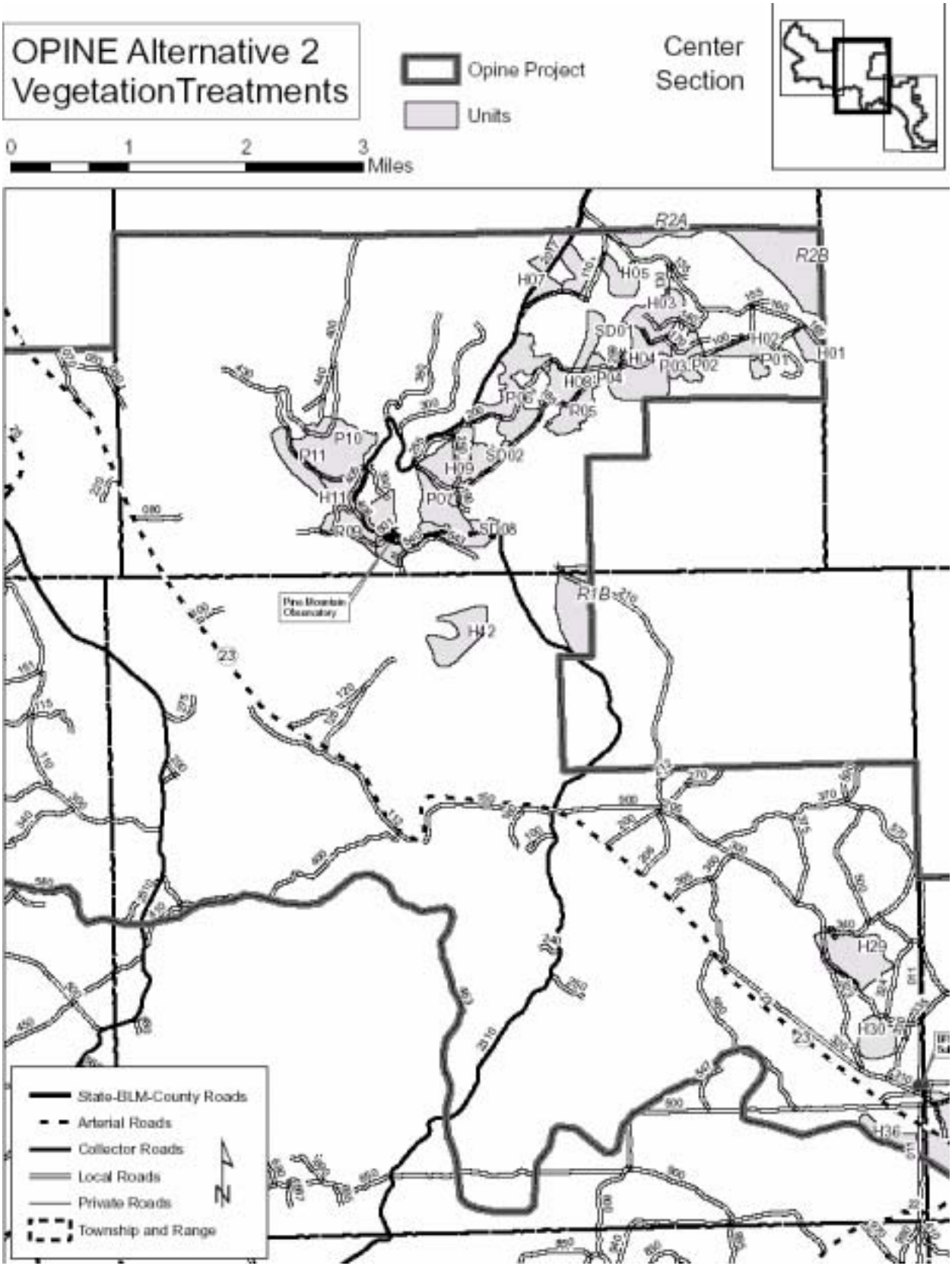


**Figure 1-4c Vegetation Treatment Units Sand Springs - Alternative 2.**

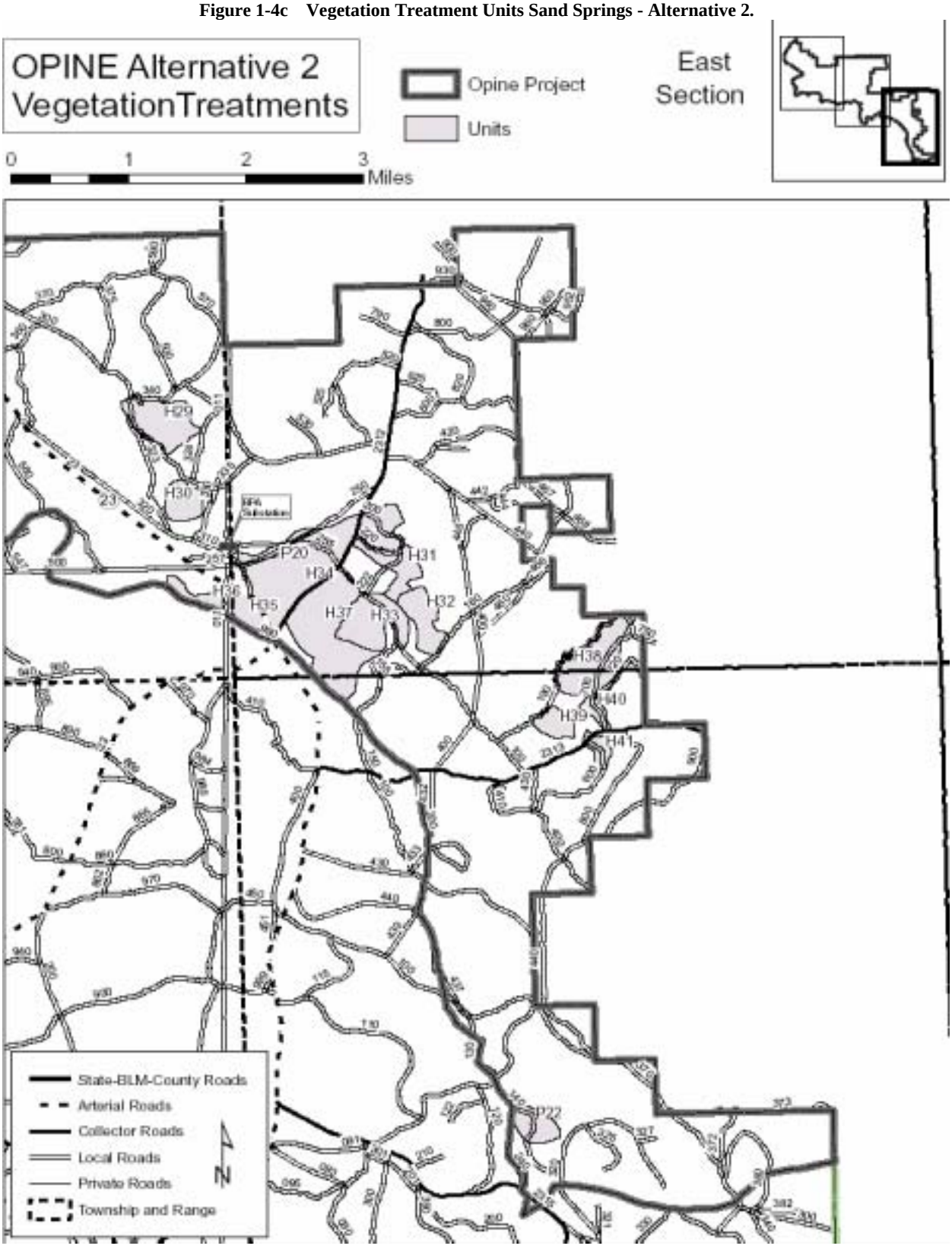


**Figure 1-5a Alternative 2 Fuel Treatment Units - Tepee Draw**

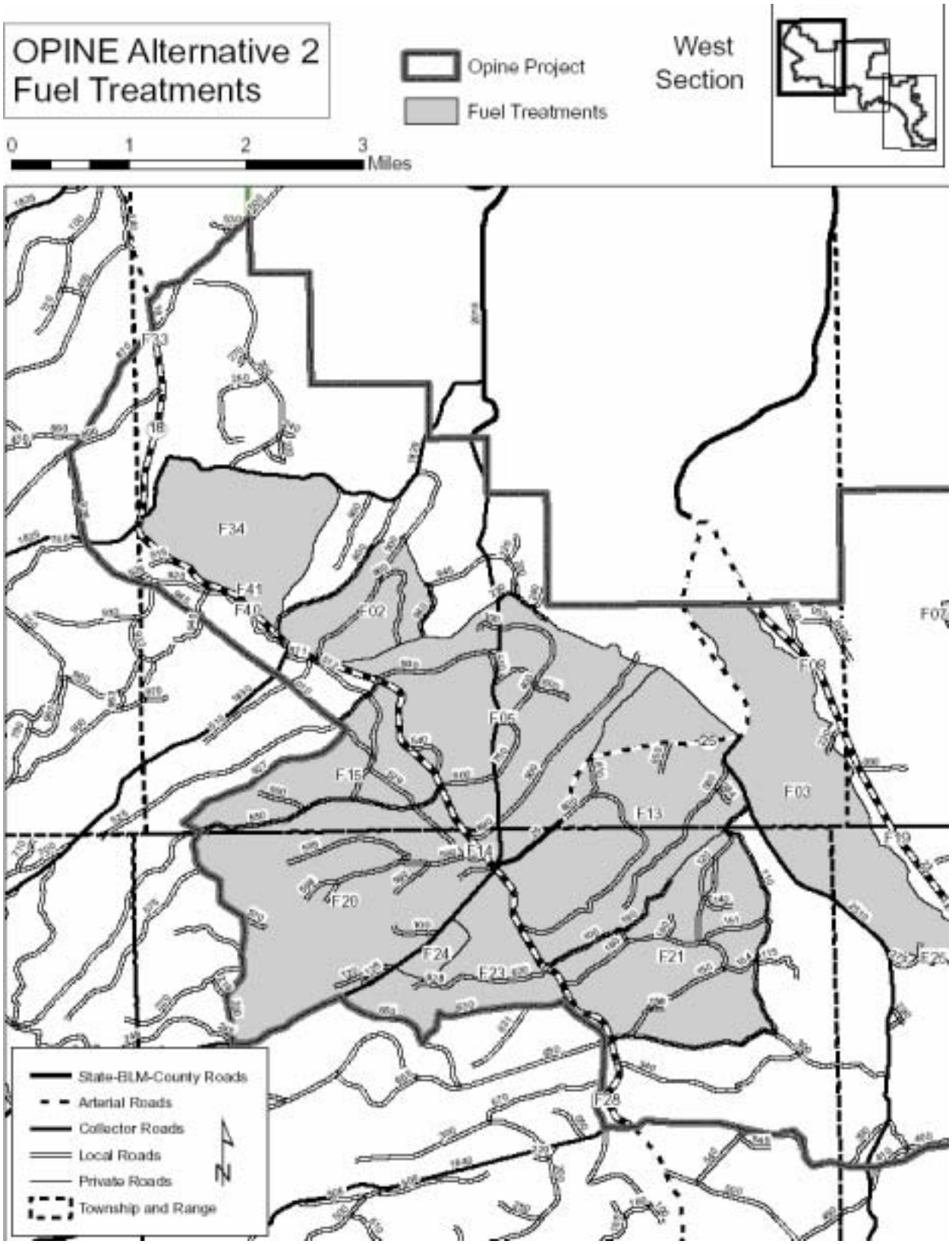


**Figure 1-5b Alternative 2 Fuel Treatment Units - Pine Mountain**

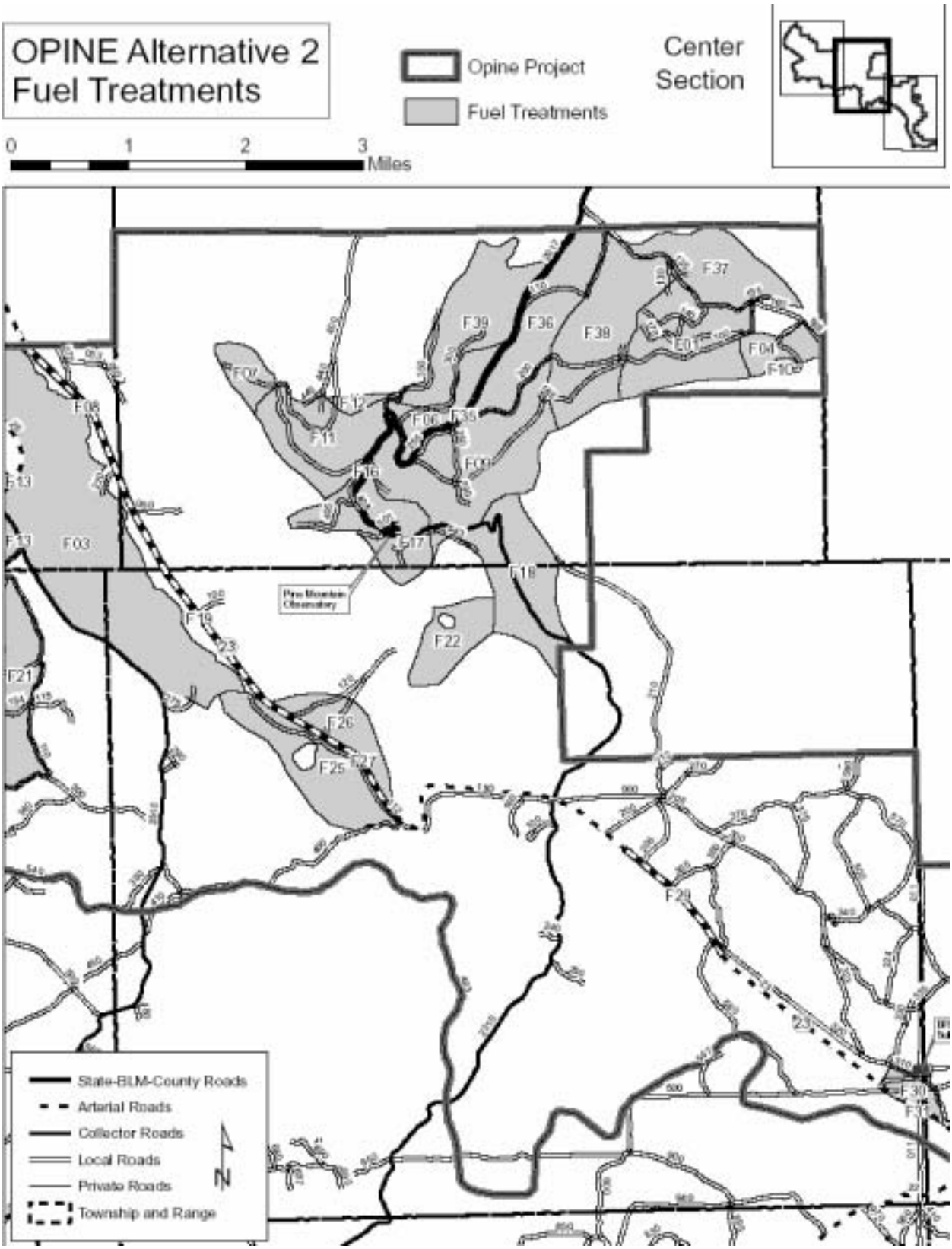
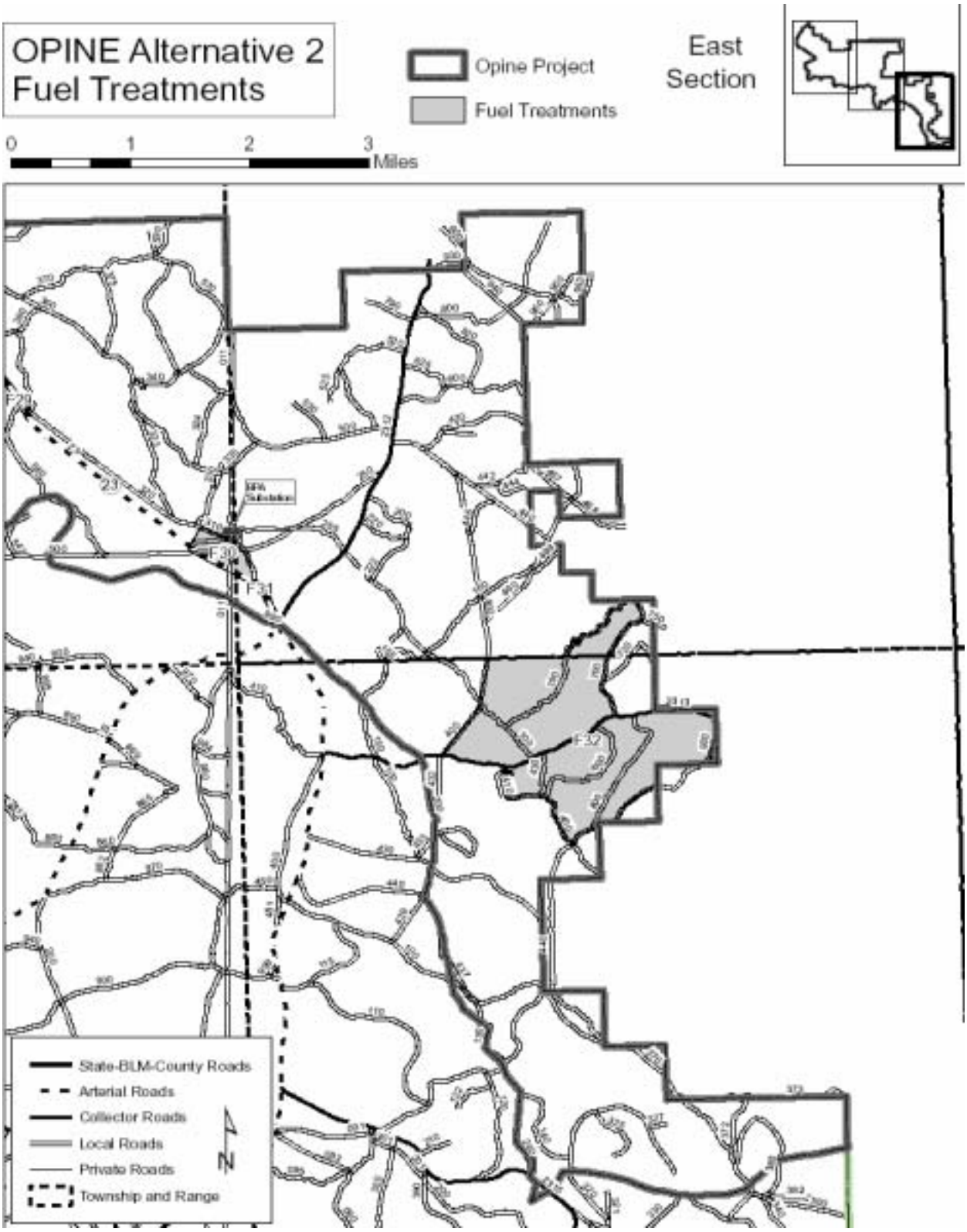


**Figure 1-5c Alternative 2 Fuel Treatment Units - Sand Springs**



## Roads

Roads 2312-466, 2312-467, and 2312-468, totaling approximately 1.1 miles, were proposed for closure when the project was originally scoped. Further analysis determined that these roads had been previously closed. They are not included in the analysis or decision.

A roads analysis was conducted to determine if any roads in the planning area were surplus to current or future management needs and could be closed or decommissioned and removed from the transportation system. Road closures and decommissioning would be used to mitigate the effects of vegetation and fuel reduction treatments on wildlife habitat, particularly to reduce the effects of reductions in hiding and thermal cover and to reduce habitat fragmentation. Approximately 19 miles of forest system roads would be closed or decommissioned. This includes the closure of approximately 3.0 miles and the decommissioning of approximately 16.0 miles of roads. All are located within the deer winter range (MA-7) and scenic views (MA-9) land allocations of the LRMP.

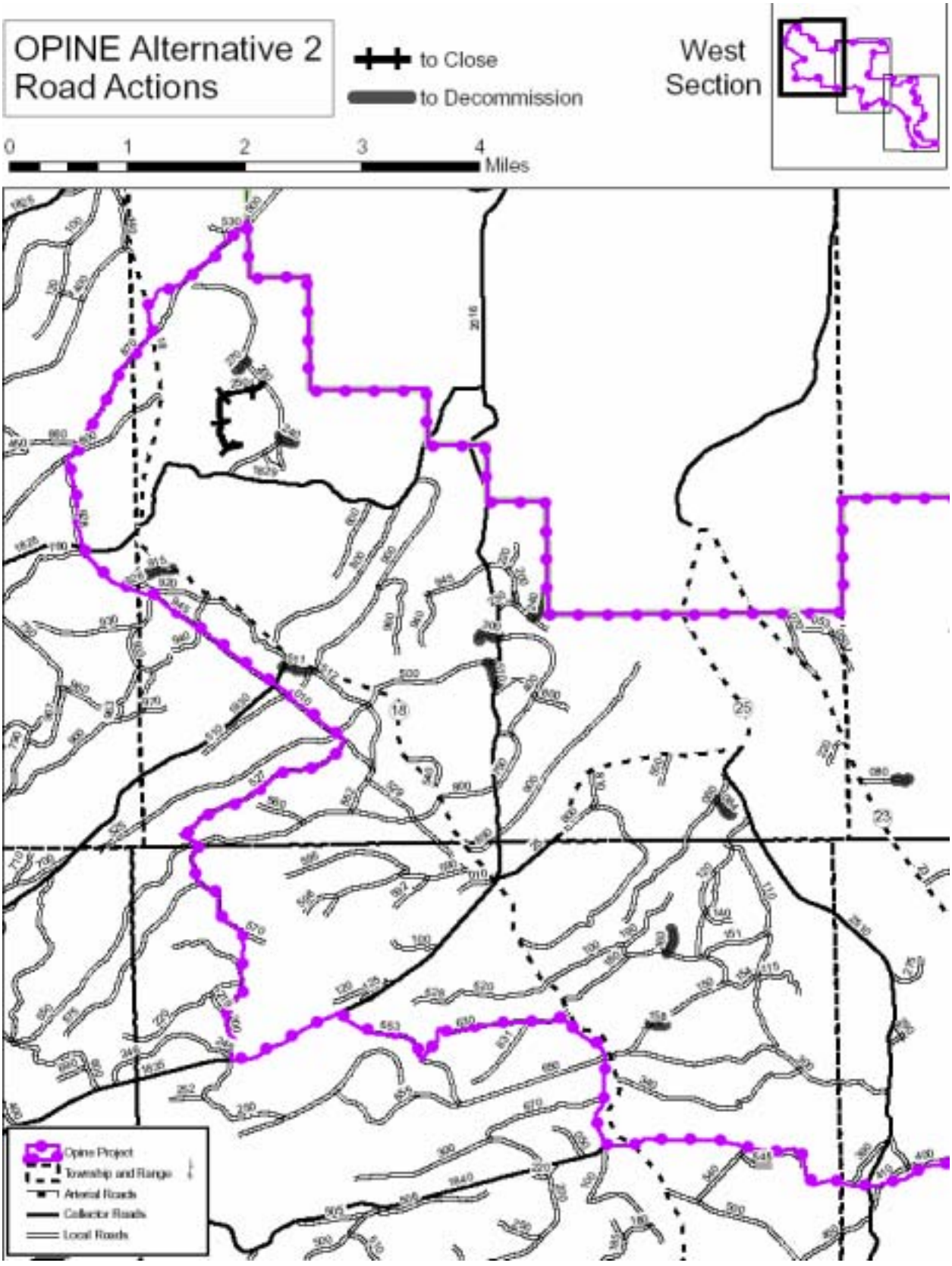
Unless otherwise noted, for the purposes of this project, a road recommended for decommissioning is removed from the transportation system.

Table 2-1 lists the roads proposed for closure and decommissioning as a result of that analysis. The table also includes the miles of road proposed for closure. Mileage figures are based on the district roads database. Figures 1-6a through 1-6c displays the specific roads or road segments proposed for closure.

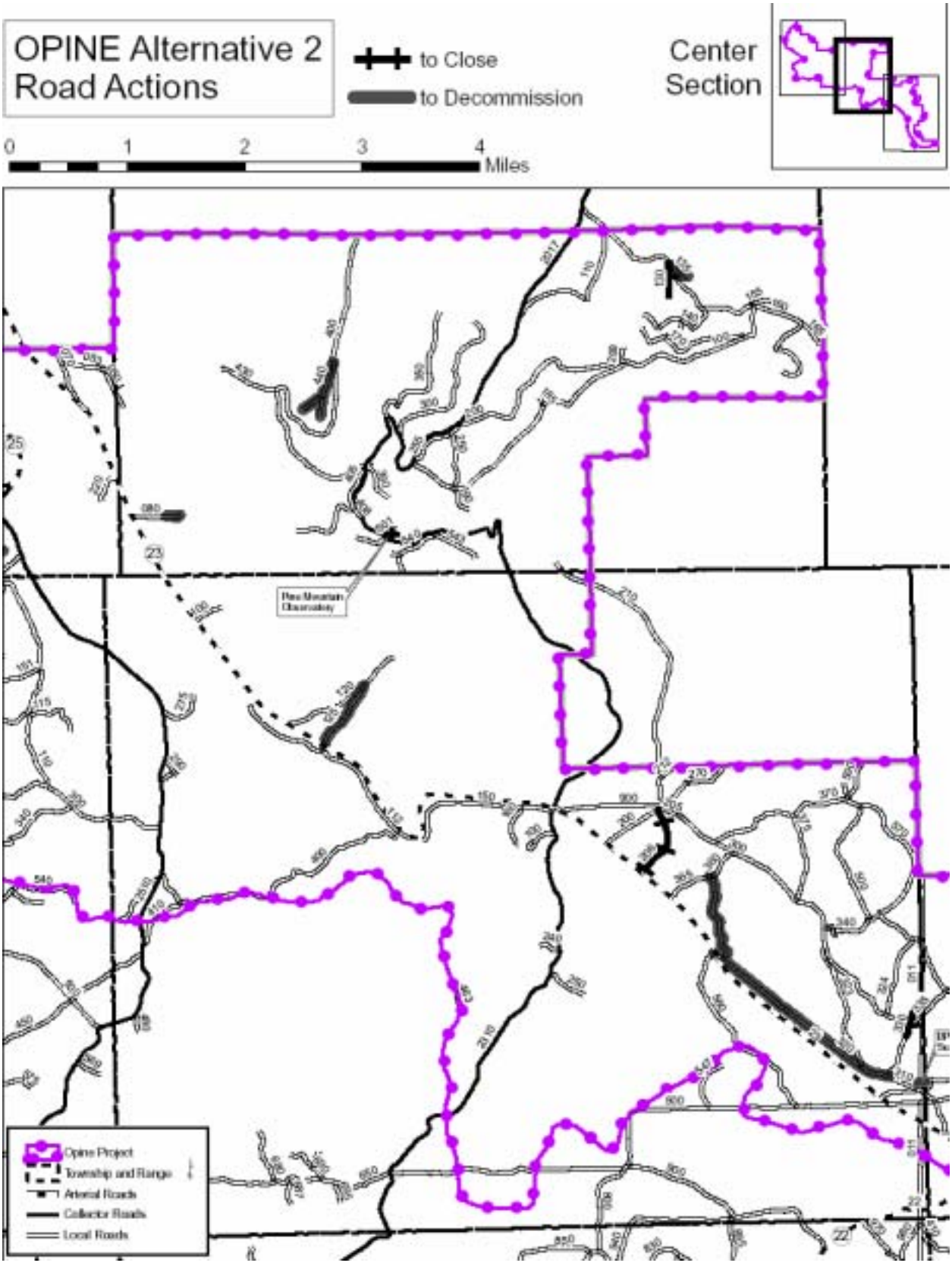
**Table 2-1 Proposed Road Closures and Decommissioning - Alternative 2.**

| Road | Miles | Status | Comments |
|---|---|---|---|
| 1829250 | 0.99 | Close | Needed for present or future management. |
| 2017130 | 0.31 | Close | Needed for present or future management. |
| 2300206 | 0.66 | Close | Needed for present or future management. |
| 2300330 | 0.37 | Close | Needed for present or future management. |
| 2312444 | 0.31 | Close | Needed for present or future management. |
| 2312530 | 0.44 | Close | Needed for present or future mgmt. |
| TOTAL | 3.08 | | |
| 1800511 | 0.22 | Decommission | Decommission beyond dispersed camp - not needed for present or future mgmt. |
| 1825915 | 0.21 | Decommission | Not needed for present or future mgmt. |
| 1829240 | 0.14 | Decommission | Not needed for present or future mgmt. |
| 1829270 | 0.12 | Decommission | Not needed for present or future mgmt. |
| 2016240 | 0.20 | Decommission | Not needed for present or future mgmt. |
| 2016300 | 0.22 | Decommission | Decommission beyond dispersed camp - not needed for present or future mgmt. |
| 2016510 | 0.19 | Decommission | Not needed for present or future mgmt. |
| 2017135 | 0.20 | Decommission | Not needed for present or future mgmt. |
| 2017440 | 0.48 | Decommission | Not needed for present or future mgmt. |
| 2017445 | 0.21 | Decommission | Not needed for present or future mgmt. |
| 2300080 | 0.15 | Decommission | Decommission beyond fence line - not needed for present or future mgmt. |
| 2300125 | 0.64 | Decommission | Decommission from 23 Road to 2300365 junction - not needed for present or future mgmt. Recommended for Conversion to OHV trail |
| 2300150 | 1.36 | Decommission | Not needed for present or future mgmt. |
| 2300320 | 1.84 | Decommission | Decommission from 23 Road to 2300308 junction - not needed for present or future mgmt. Recommended for Conversion to OHV trail |
| 2300360 | 1.12 | Decommission | Decommission from 23 Road to 2300365 junction - not needed for present or future mgmt. |
| 2312422 | 0.28 | Decommission | Not needed for present or future mgmt. |
| 2312446 | 0.40 | Decommission | Not needed for present or future mgmt. |
| 2312525 | 0.34 | Decommission | Not needed for present or future mgmt. |
| 2313410 | 0.27 | Decommission | Not needed for present or future mgmt. |
| 2313810 | 0.14 | Decommission | Not needed for present or future mgmt. |
| 2315327 | 0.17 | Decommission | Not needed for present or future mgmt. |
| 2510084 | 0.18 | Decommission | Not needed for present or future mgmt. |
| 2510158 | 0.12 | Decommission | Not needed for present or future mgmt. |
| 2510160 | 0.22 | Decommission | Not needed for present or future mgmt. |
| TOTAL | 15.58 | | |

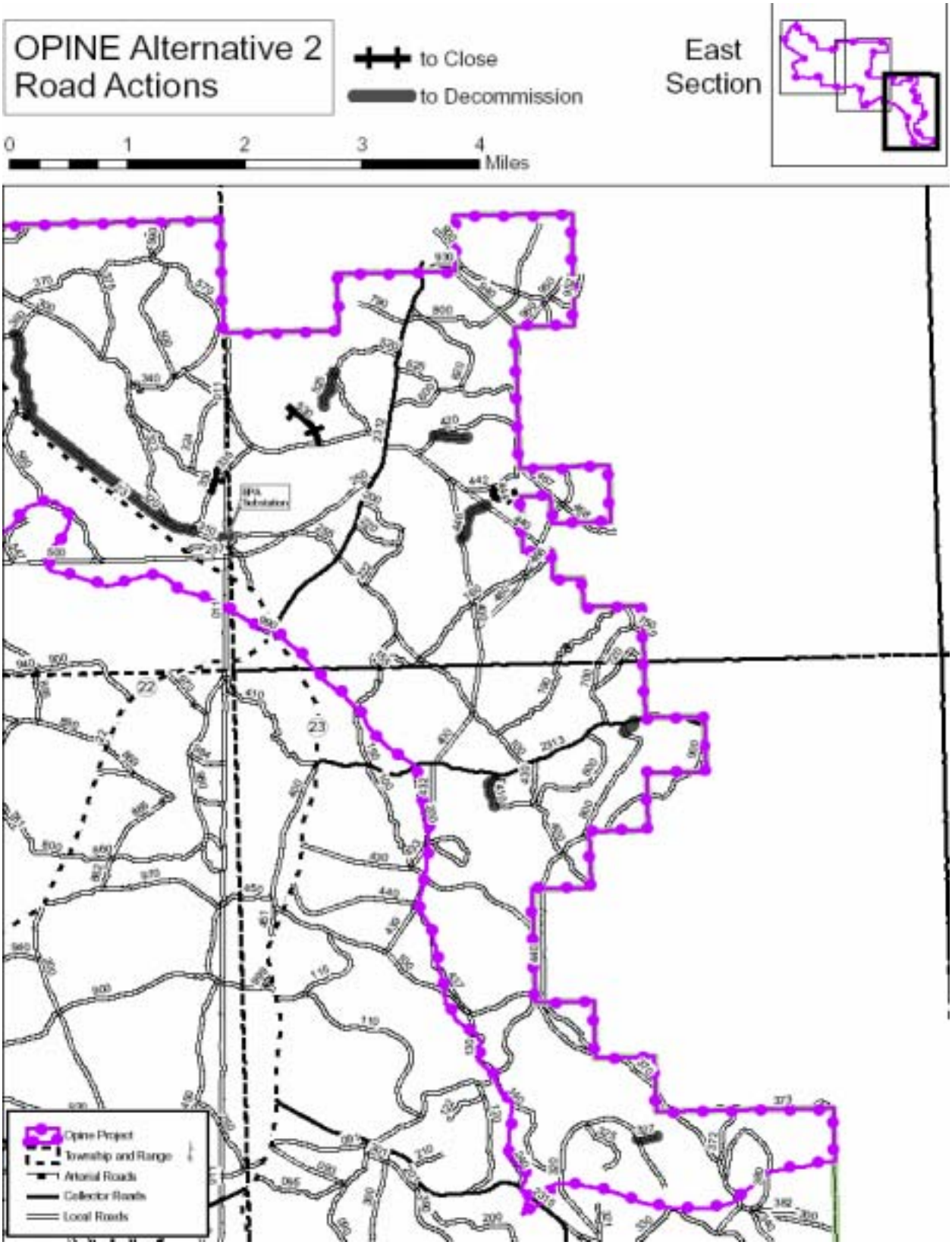
**1-6a Alternative 2 Proposed Road Closures and Decommissioning – Tepee Draw**



**1-6b Alternative 2 Proposed Road Closures and Decommissioning – Pine Mountain**



**1-6c Alternative 2 Proposed Road Closures and Decommissioning – Sand Spring**



No road reconstruction would be required on existing system roads. Thirty-seven (37) miles of system roads would have maintenance performed prior to commercial harvest activities to bring them up to standard for log haul. Table 2-2 displays the specific activities proposed and the roads on which those activities would be done.

**Table 2-2 Proposed Road Maintenance Activities - Alternative 2.**

| ROAD NUMBER | FROM MILE POST | TO MILE POST | NUMBER OF MILES |
|---|---|---|---|
| CLAY/CRUSHED AGGREGATE | | | |
| 18 | 17.095 (Opine Bdy) | 26.585 (Opine Bdy @ 1840 Junction) | 9.49 |
| CRUSHED AGGREGATE (4 inch) | | | |
| 23 | 6.733 | 18.682 (@ 22 Junction) | 11.95 |
| 2510 | 1.560 (OHV Staging Area) | 5.120 (Opine Bdy) | 3.56 |
| 2017 | 3.598 (National Forest Boundary) | 8.127 (2017-500 Junction) | 4.53 |
| DRAINAGE WORK (ARMORING ROLLING DIPS, LEADOUTS, & OUTSLOPES, BRUSHING, AND SHAPING) | | | |
| 2017 | 8.127 (2017-500 Junction) | 12.509 (23 Junction) | 4.38 |
| 2310 | 0.000 (23 Junction) | 3.000 (Project Bdy) | 3.00 |

## Alternative 3

This alternative was developed in response to concerns and comments received during scoping that were expressed about the effects of proposed treatments on wildlife and wildlife habitat, specifically mule deer, hiding and thermal cover and the availability of bitterbrush, and important winter browse species for wintering mule deer. This alternative proposes a variety of vegetation (commercial and non-commercial thinning) and fuels reduction treatments on 17,226 acres. This includes approximately 7,118 acres of thinning treatments in ponderosa and lodgepole pine stands. Within these treated stands are also proposed 5,855 acres of fuels reduction treatments. An additional 10,108 acres of fuel reduction treatments in xeric shrublands and forest stands are proposed outside of the commercial and non-commercial treatments.

This alternative does not treat any of the areas that would require a Forest Plan Amendment under Alternative 2, except for the units that would not meet hiding cover requirements after proposed treatments. This proposed non-significant Amendment 2 would waive S&G WL-54, which requires that 30 percent of the National Forest land within each *Implementation Unit* (IU) be in hiding cover. This amendment would be specific to the MA-9 and MA-15 land allocations on Pine Mountain located in IU #52 and the MA-15 allocation associated with the Pumice Springs OGMA in IU #57.

Alternative 3 includes the following activities:

**Commercial Thinning Harvest with Non-Commercial Thinning Units**

- Thin to reduce stand competition, culture large trees and retain a combination of single story and multi-story canopy (3,855 acres);

**Non-Commercial Thinning Units**

- Thin to reduce stand competition, culture large trees and move towards a single story canopy (3,263 acres);

***Total: 7,118 acres***

**Fuels Reduction in Commercial Units**

- Fuels Reduction units underburning (731 acres);
- Fuels Reduction units with burning beneath the dripline (1,891);

**Fuels Reduction in Non-Commercial Units**

- Fuels Reduction units underburning (3,058 acres)
- Fuels Reduction with burning beneath the dripline (175 acres)

***Total: 5,855 acres*** Fuels Reduction within Commercial and Non-Commercial Treatments

**Fuels Reduction in Xeric Shrublands and Forest Stands Units**

- Underburning (1,505 acres);
- Burning beneath the dripline (1,875 acres) ;
- Pretreat (cut trees less than 4 inches dbh with follow-up underburn) and Underburn (5,658 acres);
- Pretreat, Grapple Pile, Burn Piles, and Mow (101 acres);
- Pretreat, Hand Pile, Burn Piles, & Underburn (341 acres);
- Pretreat, Mow, & Underburn (138 acres);
- Hand Fall or Mow Juniper 9 inches dbh and less (63 acres);
- Mowing and Prescribed fire (133 acres);
- Prescribed Fire (39 acres);
- Mow and Underburn (172 acres);
- Mow (83 acres).

***Total: 10,108 acres***

**Connected Actions**

In order for Alternative 3 to be implemented, the following connected actions would also need to be implemented[10]:

- Of the 42 miles of currently opened system roads, approximately 28 miles would be closed following vegetation management activities. Approximately 14 miles of system roads are proposed for decommissioning (removed from the transportation system). Of the 14 miles proposed for decommissioning, approximately 10 miles would be subsoiled to mitigate the effects of vegetation and fuel reduction treatments on wildlife habitat, particularly to reduce the effects of reductions in hiding and thermal cover and to reduce habitat fragmentation.
- Road maintenance to apply clay or crushed aggregate to surface on about 30 miles of roads.
- Road maintenance, especially blading, brushing, and shaping would be performed on about 8.0 miles of roads.
- About 1.05 miles of temporary roads would be constructed to facilitate economical timber harvest and obliterated/subsoiled upon completion of harvest activities.

**Proposed Forest Plan Amendments**

Of the three plan amendments proposed under Alternative 2, only **Amendment 2,** the amendment to waive hiding cover requirements for deer summer range in Implementation Unit #52 and #57 would be necessary under Alternative 3.

All thermal cover that meets the LRMP definition (has a canopy closure of 40 percent or greater), would be retained under this alternative resulting in no loss of that thermal cover. Therefore a forest plan amendment to waive the thermal cover objective is not required.

No regeneration harvest is proposed under this alternative and therefore this alternative complies with management direction contained in the Eastside Screens. Therefore, a forest plan amendment is not required to amend the Screens to allow for regeneration harvest.

[10] Please refer to the Transportation System section in Chapter 3 of this document for descriptions and definitions of these activities.

**Commercial Harvest with and without Non-Commercial Harvest and Fuels Reduction Units**
This alternative would authorize the treatment of 7,118 acres of forest stands by small and medium tree harvest to reduce stand densities and fuel loadings. This would include medium tree thinning (trees up to 21 inches dbh) of 1,551 acres; 2,210 acres of medium tree thinning with follow-up small tree thinning (up to 16 inches dbh) of the residual understory (trees generally less than eight (8) inches dbh); and small tree thinning of 3,357 acres. There would be no regeneration (clearcut or shelterwood) harvest.

Medium and small tree harvest would be accomplished using the same methods and types of machinery as described under Alternative 2. Commercial harvest units would be harvested using whole tree yarding with slash piled on the landing and burned.

To increase habitat diversity (increased browse and long-term cover) within treatment areas in the Tepee Draw area, 50 to 100 feet openings would be created near leave areas on approximately 1/3 of the acres in units C316, C317, and C320.

Units P312 and P314 would be underburned prior to implementing thinning, because if trees are killed by underburning on these steep slopes they would not be selected for leave trees during thinning. The desired condition in unit P314 is to retain 10 to 30 large overstory trees per acre.

In the Sand Springs area, units C333, C334, and approximately one half of C335 are lodgepole pine. Residual tree spacing would be 20 to 25 feet with 20 percent retention between units with no post sale small tree thinning. Additionally, in Unit C334, a contiguous block of approximately 138 acres of existing optimal thermal cover (thermal cover meeting the LRMP definition of thermal cover with 40 percent or more canopy closure) would remain untreated. This would be in addition to the 20 percent retention in the remaining 252 acres of the unit. The wildlife corridor in unit C337 would not be thinned. Medium tree and small tree harvest would be accomplished using the same methods as described under Alternative 2.

Slash created by medium tree and small tree non-commercial harvest on 5,942 acres would be treated by lopping and scattering. There would be no machine piling and burning. If market conditions permit commercial harvest for tree removal of the medium and small trees from these acres they would be yarded tree length to landings. Slash would be piled and burned on landings. Incidental concentrations remaining in the treatment unit following commercial harvest would be lopped and scattered if necessary to meet fuel prescription requirements. There would be no slash treatment on 1,179 acres because slash loadings are expected to be within prescription for fuel loading.

Fuel reduction treatments in harvest units would include 3,721 acres of underburning and 2,294 acres of burning beneath the driplines of residual trees. This would require the construction of approximately two (2) miles of machine fireline adjacent to portions of units F01, F18, F38, and F39 (approximately 0.5 miles per unit). Incidental construction of hand firelines may be required, particularly where slopes preclude the use of mechanized equipment (slopes greater than 30 percent). Firelines would be rehabilitated as described under Alternative 2.

One quarter (0.25) acre within the Pine Mountain Observatory permit area boundary would be planted with trees to provide additional screening between the telescopes and the new parking lot and Forest Road 2017 as described under Alternative 2. Approximately 11 acres of existing openings in unit C319 would not be planted.

Access to harvest units C311, C313, C314, and P322 would require the construction of 1.05 miles of temporary road. These roads would be obliterated upon completion of harvest activities. Closure methods would be the same as described for Alternative 2.

Mechanical harvest and temporary road construction activities proposed by this alternative are projected to result in detrimental soil damage (compaction) above the 20 percent standard in a total of nine (9) medium tree harvest units (C302, C303, C305, C308, C314, C324, C332, C336, and C339) including seven (7) that also include small tree harvest (C303, C308, C314, C324, C332, C336, and C339).

Approximately 47 acres would be subsoiled to reduce detrimental soil impacts to either at or below 20 percent for those units that currently do not exceed the standard (units (C302, C303, C305, C308, C314, C324, C332, and C339)) and to either current levels or below for those units that currently exceed the 20 percent standard.(unit C336). An additional one (1) acre associated with the decommissioning of system roads would also be done in small tree harvest units P305, P317, and P321.

**Fuel Reduction Treatments in Xeric Shrublands and Forest Stands**

This alternative also proposes fuel reduction treatments on an additional 10,108 acres. Of this total, 5,658 acres, units F04, F05, F11, F15, F20, F21, F23, F34, F36, F38, F39, would include pretreating by the falling of all trees four (4) inches dbh and smaller using chain saws and then underburning. Pretreatment would eliminate ladder fuels. Treatments would create a mosaic of treated and untreated areas. With the exception of units F05, F15, F20, and F21, 60 to 80 percent of each unit would be treated. In unit F20, 40 to 60 percent of the unit would be treated. In units F05, F15, and F21, 50 to 70 percent of the unit acres would be treated. In units F05 and F21, underburning would be concentrated in areas of extreme fire behavior potential along Road 18 and feathering the treatment away from the road. Where the fire behavior potential is rated as moderate, no pretreatment or underburning would be implemented.

A total of 101 acres along Roads 18 and 23 would be pretreated by felling all trees four (4) inches dbh and smaller to reduce ladder fuels, grapple piled, and the piles burned followed by mowing of understory shrub vegetation as described under Alternative 2 (units F29, F31, and F40). Slash would be piled using a ground based machine with a grapple arm capable of reaching out 18 to 20 feet and would be restricted to a single pass to minimize soil disturbance. No acres would be treated by the combination of pretreatment, machine piling, burning the piles, and underburning. In units F31 and F40, located along Roads 23 and 18 respectively, the unit width would average approximately 150 feet on each side of the road. Approximately 60 to 80 percent of each unit would be treated resulting in a mosaic of treated and untreated areas.

A total of 341 acres (units F09 and F17) would be pretreated by felling all trees four (4) inches dbh and smaller to reduce ladder fuels, hand piled, the piles burned, and units underburned. Unit F09 would be underburned in stages because of slope and stand conditions. Unit F17 surrounds and includes the Pine Mountain Observatory special use permit site. Portions of the unit near and below the observatory would require full treatment; the remaining other portion would be underburned. Moderate levels of treatment would be implemented around the Pine Mountain campground. Approximately 60 to 80 percent of each unit would be treated resulting in a mosaic of treated and untreated areas.

A total of 138 acres (units F14, F35, and F41) would be pretreated by felling all trees four (4) inches dbh and smaller to reduce ladder fuels followed by mowing and underburning as described under Alternative 2. Approximately 60 to 80 percent of each unit would be treated resulting in a mosaic of treated and untreated areas. In units F14 and F35, located along Roads 18 and 2017 respectively, unit widths would average approximately 150 feet along each side of the road.

A total of 83 acres (units F33 and F46) would have fuel loadings reduced by mowing only as described under Alternative 2. Approximately 70 to 75 percent of each unit would be treated resulting in a mosaic of conditions. Unit F33, located along Road 18, would average 150 feet in width on both sides of the road.

A total of 172 acres (units F08 and F19) along Road 23 would have fuel loadings reduced along the east side of the road by mowing, which would be feathered and create a mosaic of mowed and untreated areas with treatment intensity decreasing as distance from the road increased. On the east side of the road, both units would be treated with a prescribe underburn initiated in the fall of the year. The burn would extend from the east boundary of Unit F03 toward the road. Areas that do not meet the fuel prescription would be mowed. Dispersed sites and OHV trails west of Road 23 would be protected. Average width of each unit east of the road would be 200 feet.

A total of 63 acres (units R3Aeast and R3Awest) would have juniper trees nine (9) inches dbh and smaller felled. Slash would be lopped and scattered and left on site. No burning or mowing would follow.
A total of 133 acres (unit R1B) would be treated by a combination of mowing and underburning to reduce fuel loadings associated with high shrub densities, particularly manzanita. Mowing would be limited to slopes of 25 percent or less on approximately 88 acres. Slopes over 25 percent, approximately 45 acres, would be treated by underburning.

Unit R1A, 39 acres, would have prescribed fire applied to reduce fuel loadings associated with high shrub densities.

A total of 1,505 acres (units F01, F06, F13, and F18) would be treated using underburning only as described under Alternative 2 to protect bitterbrush in open areas between trees. With the exception of unit F13, 60 to 80 percent of each unit would be treated to create a mosaic of conditions. In Unit F13, 40 to 60 percent of the unit would be treated. Additionally, underburning in this Unit (F13) would be concentrated in areas of extreme fire behavior potential along Roads 18 and 25 and feathering the treatment away from the road. Where the fire behavior potential is rated as moderate, no underburning would be implemented. In Unit F18, the desired condition is to retain 10 to 30 large overstory trees per acre.

A total of 1,875 acres (F03, F24, F27, F28, and F32) would be treated by underburning only beneath the drip line of trees as described under Alternative 2. With the exception of unit F03, 40 to 60 percent of each unit would be treated to create a mosaic of burned and unburned areas. In unit F03, 20 to 30 percent of the unit would be treated and a fuel break would be created around broken lavas. Unit width in unit F27 along Road 2017 would average 200 feet on each side of the road. Unit width in unit F28 along Road 18 would average 150 feet along each side of the road.

Fuel treatment units F01, F18, F38, and F39 would require the construction of two (2) miles of machine fire line which would be rehabilitated as described under Alternative 2. Incidental construction of hand line may be needed in units where slopes preclude or limit the operation of machine and/or where slopes exceed 30 percent. Construction and rehabilitation would follow that described under Alternative 2.

To mitigate the effects of tree harvest and fuel reduction treatments on deer hiding and thermal cover levels, 20 percent of each treatment unit would be retained in an untreated state. Where present, existing cover patches would be selected for retention up to the 20 percent level before non-cover patches are selected to bring the untreated percentage to 20 percent. All optimal thermal, such as cover that has a canopy closure of 40 percent or more, would be retained.

Table 2-3 contains a description of the types of proposed treatments activities. Their specific proposed vegetation and fuel reduction treatments unit locations are displayed in Figures 2-1a through 2-1c and 2-2ab through 2-2c within the planning area. The process used to strategically locate these units is based on field surveys and specialist input.

Vegetation treatments are projected to result in the production of approximately 11,000 cunits (1 cunit = 100 cubic feet) or approximately 5.65 million board feet of merchantable wood fiber.

**Table 2-3 Proposed Treatments - Alternative 3.**

| TREATMENT TYPE | UNIT NUMBER | ACRES[11] |
|---|---|---|
| **VEGETATION TREATMENTS** | | |
| Commercial and non commercial units identified by type of treatment and were located to strategically reduce fuel loadings and forest vegetation density so as to lessen the risk that disturbance events such as insect, disease, and wildfire which may lead to large-scale loss of forest. Commercial harvest treatments would contribute to the local and regional economies by providing timber and other wood fiber products. See map in Chapter 2 for unit locations. | | |
| ***Small and Medium Tree harvest (Trees to 21 inches DBH)*** | | |
| **Commercial Harvest w/Non-Commercial Harvest** | **C303, C307-309, C311, C313, C314, C316-328, C331, C332, C335-337, C339** | **2,210** |
| **W/Subsoiling** | **C303, C308, C314, C324, C332, C336, C339** | **44** |
| **Slash Treatment** | | |
| **Lop & Scatter** | **C303, C307-308, C311, C313, C314, C316-328, C331, C332, C335[12]-337, C339** | **2,072** |
| **None** | **C309** | **138** |
| **Fuel Treatment** | | |
| **Underburn** | **C303, C307, C308, C323, C324, C339** | **478** |
| **Burning beneath Dripline** | **C309, C311, C313, C314, C316-322, C325-C328, C332, C335[12], C336, C337** | **1,713** |
| **None** | **C331** | **19** |
| | | |
| **Commercial Harvest w/o Non-Commercial Harvest** | **C301, C302, C304, C305, C310, C312, C315, C329, C330, C333, C334, P322** | **1,645** |
| **W/Subsoiling** | **C302, C305,** | **3** |
| **Slash Treatment** | | |
| **Lop & Scatter** | **C305, C329, C330, P322** | **604** |
| **None** | **C301, C302, C304, C310, C312, C315, C333, C334** | **1,041** |
| **Fuel Treatment** | | |
| **Underburn** | **C301, C302, C304, P322** | **253** |
| **Burning beneath Dripline** | **C310, C312, C315** | **178** |
| **None** | **C305, C329, C330, C333, C334** | **1,214** |
| **SUBTOTAL** | | **3,855** |
| | | |
| ***Small Tree Thinning (Trees 16 inches dbh and smaller)[13]*** | | |
| **Non-Commercial Harvest** | **P301-312, P314-P317, P320, P321 P323-P325, P328, P329, P331-P340, P342-P344,P346** | **3,263** |
| **W/Subsoiling** | **P305, P317, P321** | **1** |
| **Slash Treatment** | | |
| **Lop & Scatter** | **P301-312, P314-P317, P320, P321, P323-P325, P328, P329, P331-P340, P342-P344,-346** | **3,263** |

[11] Acreage figures are approximate and represent gross unit acres. Actual treatment acres are expected to be 20 percent less in commercial and non-commercial harvest units. Treated acres in fuel reduction units are expected to range from approximately eight (8) to 100 percent of the unit acres. On average, approximately 70 percent of the gross unit acreage would be treated.
[12] Approximately ½ of the unit acres in unit C335 would be treated. Only areas dominated by ponderosa pine would be treated.
[13] Small Tree Thinning units may contain trees of commercial size; i.e., trees 8 inches dbh and larger. Depending on market conditions, commercial removal of wood from within these units may be permitted. The proposed actions including the possibility of such removal occurring.

| TREATMENT TYPE | UNIT NUMBER | ACRES[11] |
|---|---|---|
| Fuel Treatment | | |
| W/Underburn | P303-312, P314-P317, P320, P321, P323-P325, P328, P329, P331-P340, P346 | 3,058 |
| W/Burning beneath Dripline | P342-344 | 175 |
| None | P301, P302 | 30 |
| SUBTOTAL | | 3,263 |
| | | |
| SUBTOTAL VEGETATION TREATMENTS[14] | | 7,118 |
| | | |
| Fuel Reduction Treatments in Xeric Shrublands and Forest Stands [15] | | |
| Pretreat & Underburn | F04, F05, F11, F15, F20, F21, F23, F34, F36, F38, F39 | 5,658 |
| Pretreat, Grapple Pile, Burn Piles, & Mow | F29, F31, F40 | 101 |
| Pretreat, Hand Pile, Burn Piles, & Underburn | F09, F17 | 341 |
| Pretreat, Mow, & Underburn | F14, F35, F41 | 138 |
| Mow | F33, F46 | 83 |
| Mow & Underburn[16] | F08[17], F19[17] | 172 |
| Tree Removal (9 inches dbh and less) by Hand Falling or Mowing | R3Aeast, R3Awest | 63 |
| Mowing and Prescribe Fire | R1B | 133 |
| Prescribe fire | R1A | 39 |
| Underburn | F01, F06 F13, F18 | 1,505 |
| Underburn Beneath Tree Dripline | F03, F24, F27[17], F28, F32 | 1,875 |
| SUBTOTAL[18] | | 10,108 |
| | | |
| TOTAL[19] | | 17,226 |

[14] This figure only includes the gross unit acres proposed for treatment. Many acres have multiple actions such as commercial and non-commercial thinning followed by slash treatment and subsequent fuel reduction treatment such as underburning or burning beneath the dripline of residual trees.
[15] These figures do not include acres previously included under vegetation treatments displayed previously.
[16] Prescription is moderate mow (feathered mosaic) on east side of Road 23 in both units. Westside of Road 23 to be burned in the fall extended from unit F03 east to road. Areas not adequately treated by burning would be mowed to meet prescription.
[17] Average width of the unit is 200 feet on east of Road 23 in units F08 and F19 and 200 feet each side of the road in Unit F27.
[18] This figure only includes the gross number of unit acres. Acres treated with multiple treatments are not duplicated in the total.
[19] This figure is the sum of the vegetation, fuel treatment, range, and sage-grouse enhancement treatment acres. It does not double count acres with multiple treatments.

**Figure 2-1a Alternative 3 Vegetation Treatment Units, Tepee Draw.**

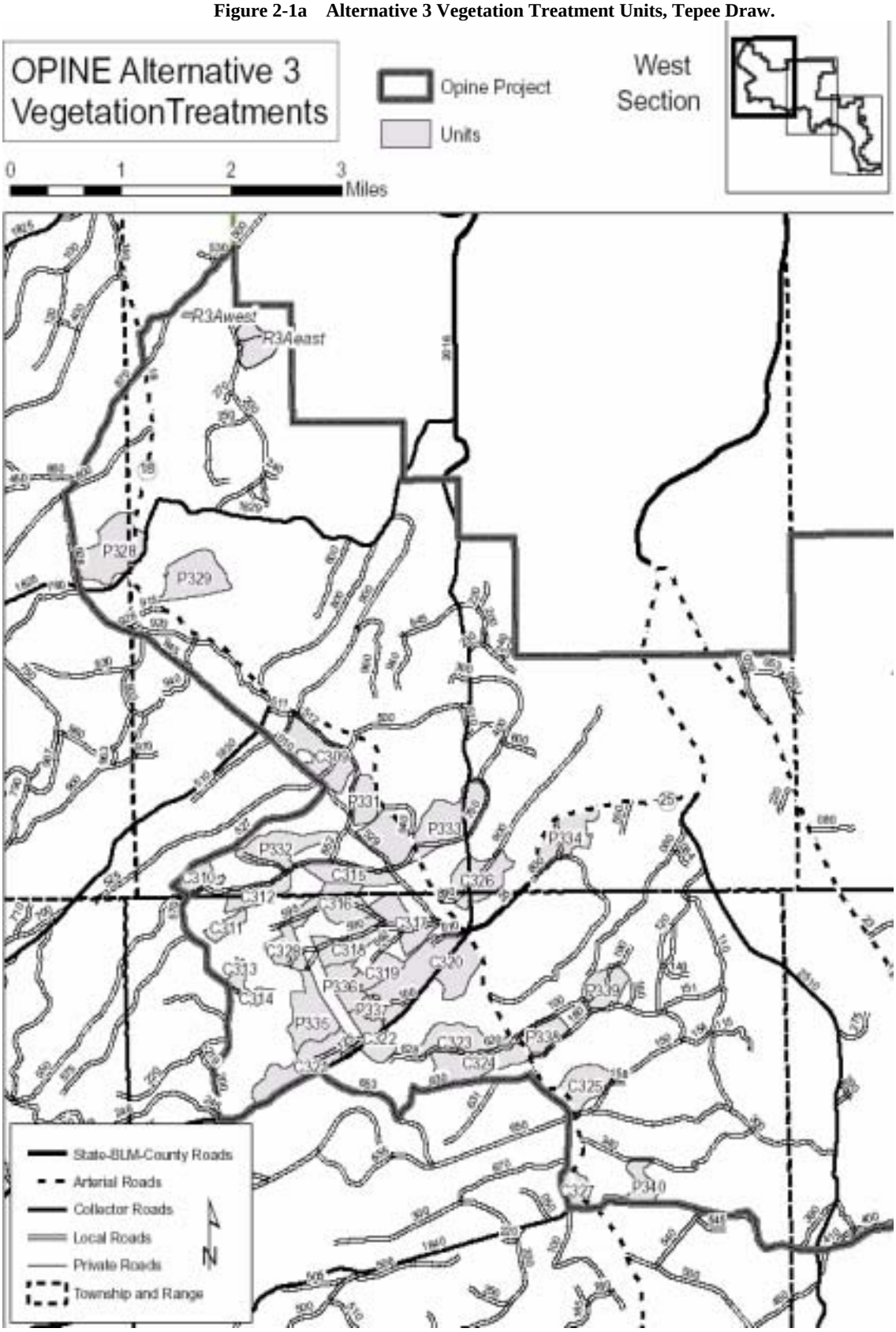


**Figure 2-1b Alternative 3 Vegetation Treatment Units – Pine Mountain**

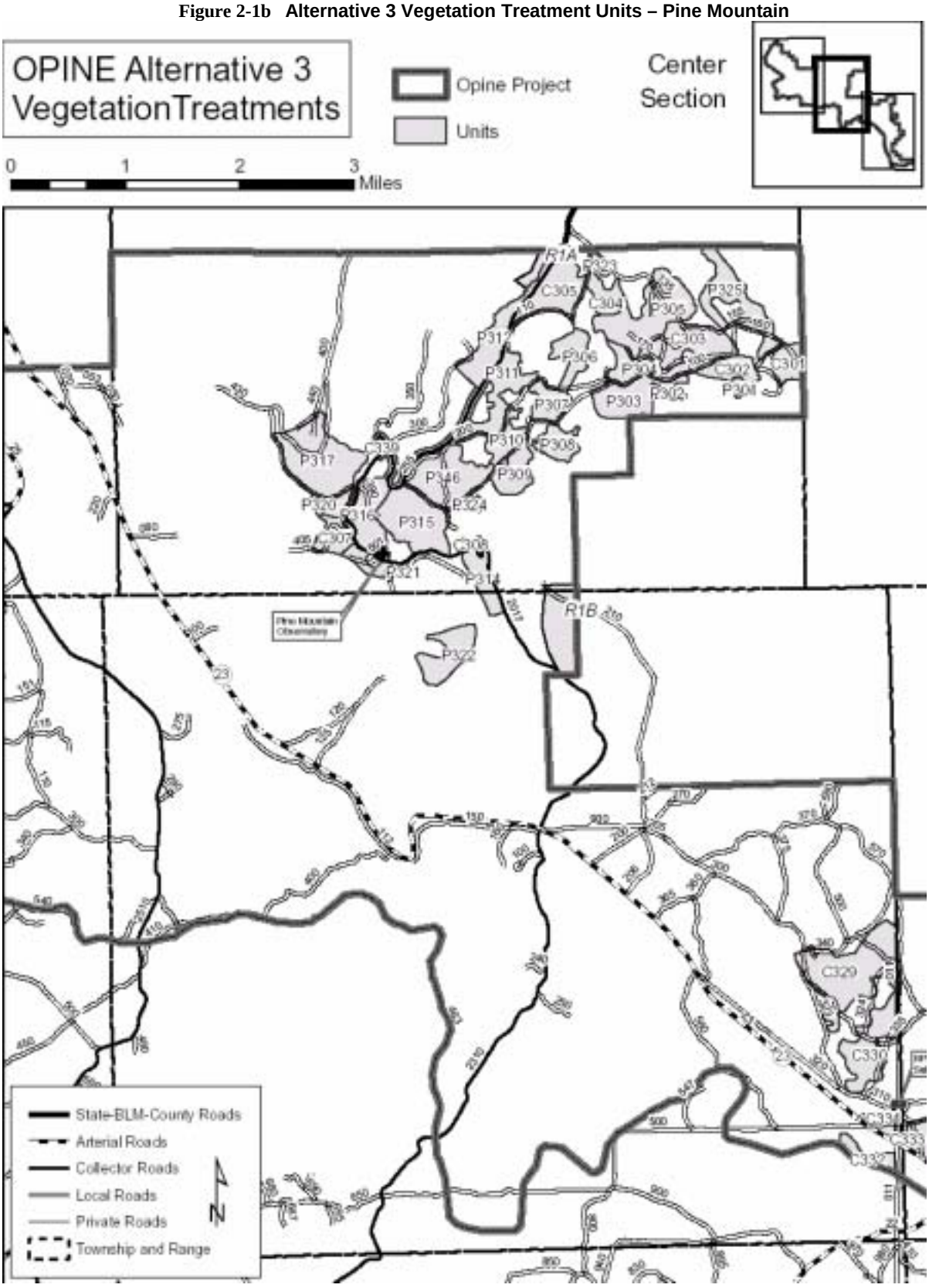


**Figure 2-1c Alternative 3 Vegetation Treatment Units – Sand Springs**

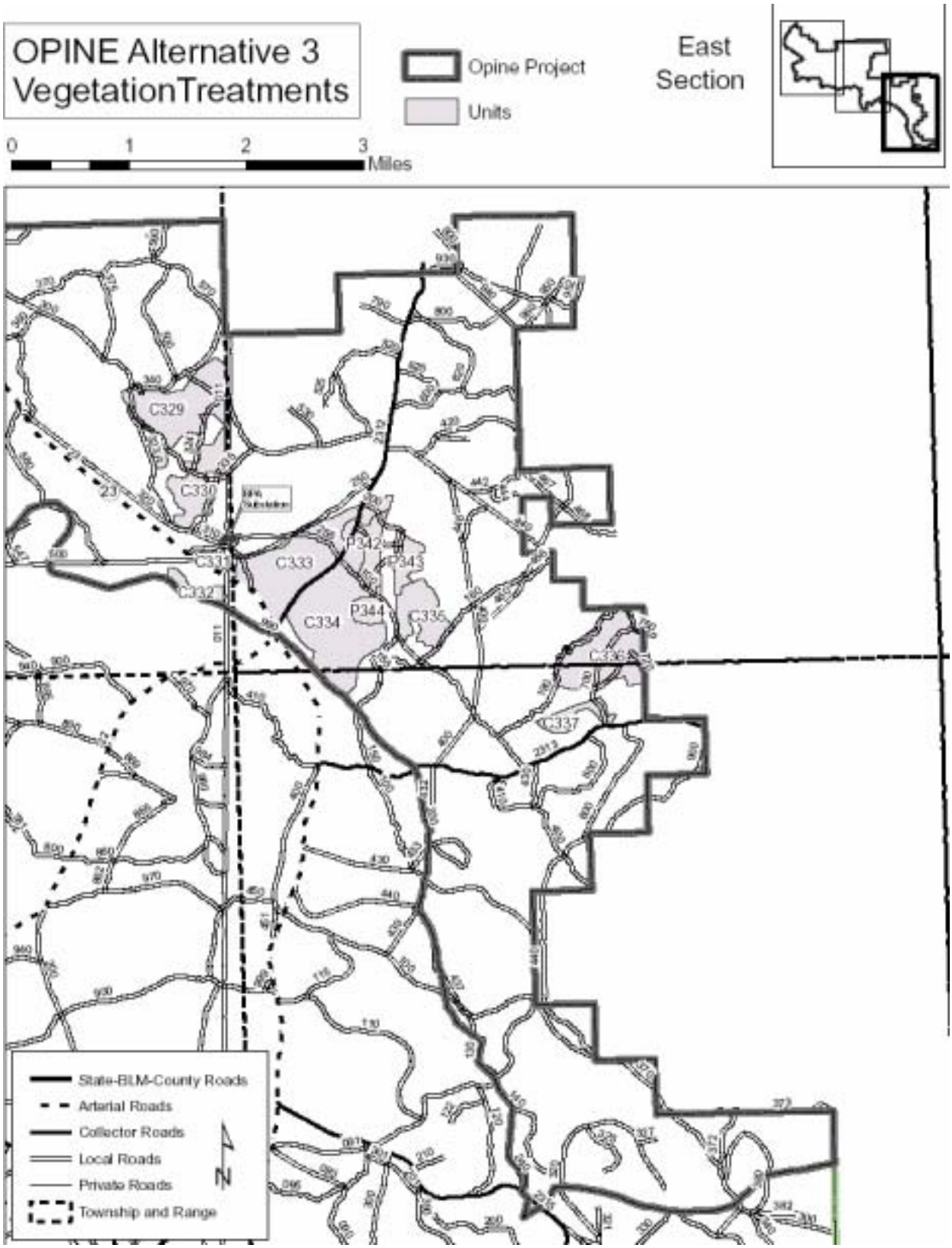


**Figure 2-2a Alternative 3 Fuel Treatment Units - Tepee Draw.**

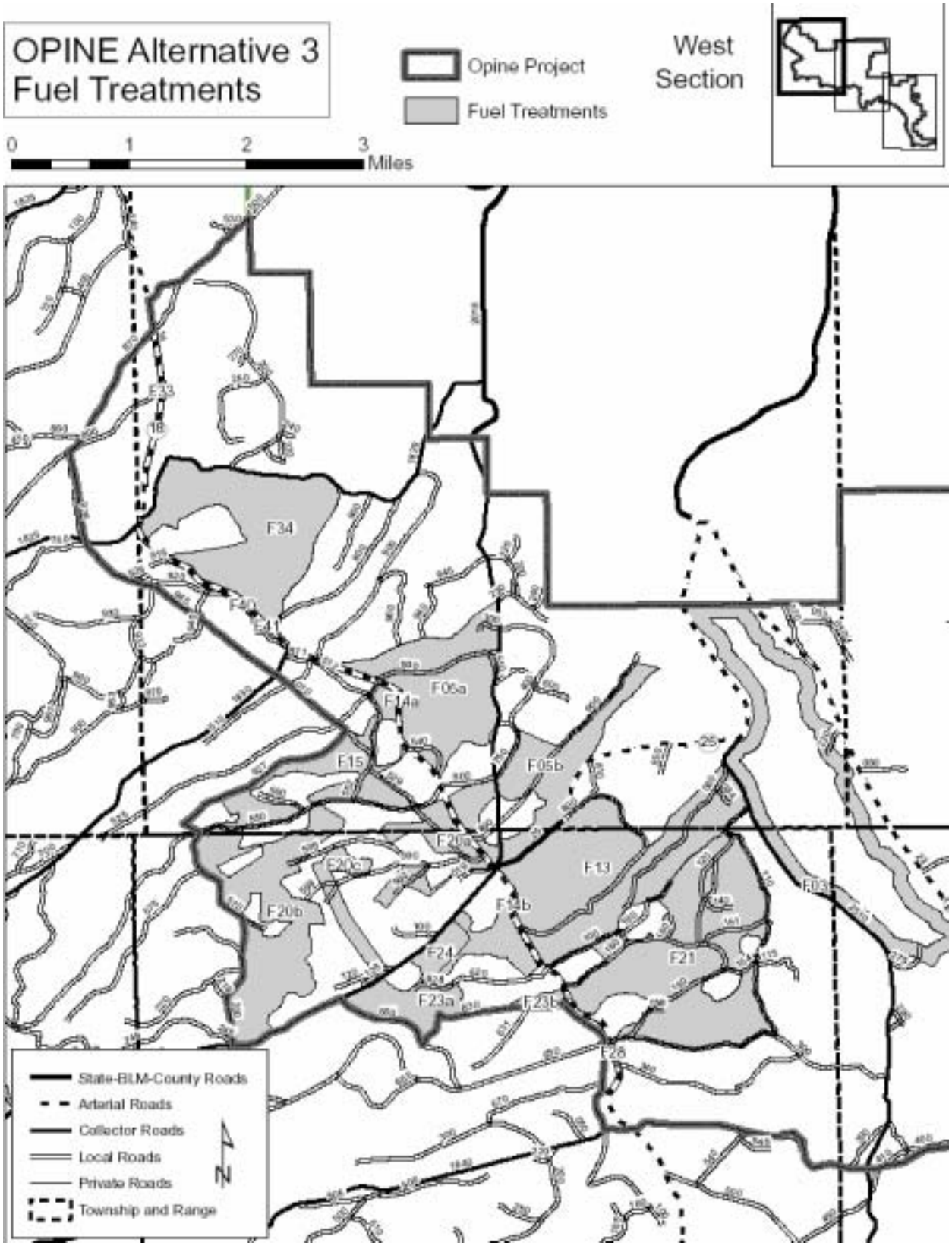


**Figure 2-2b Alternative 3 Fuel Treatment Units – Pine Mountain.**

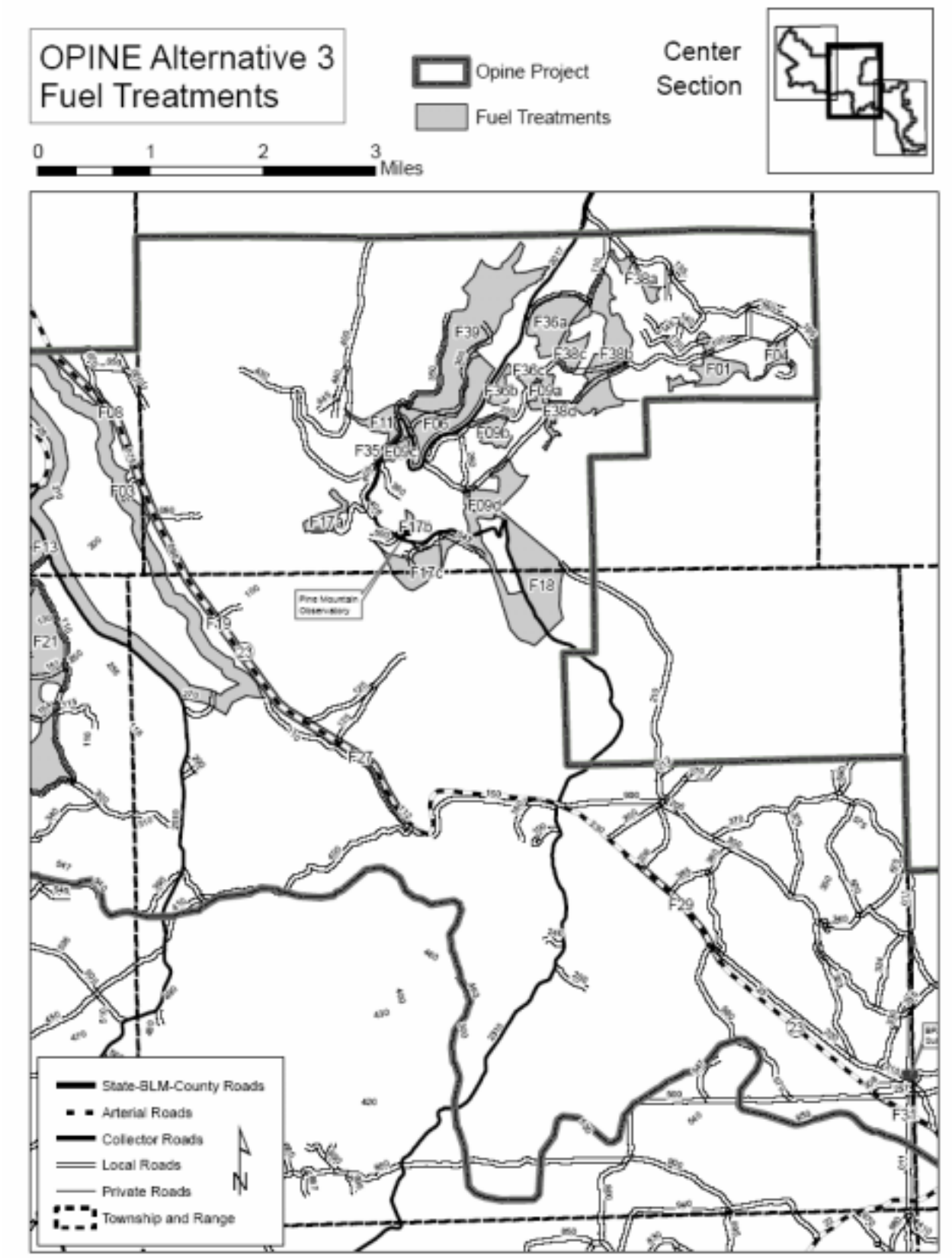
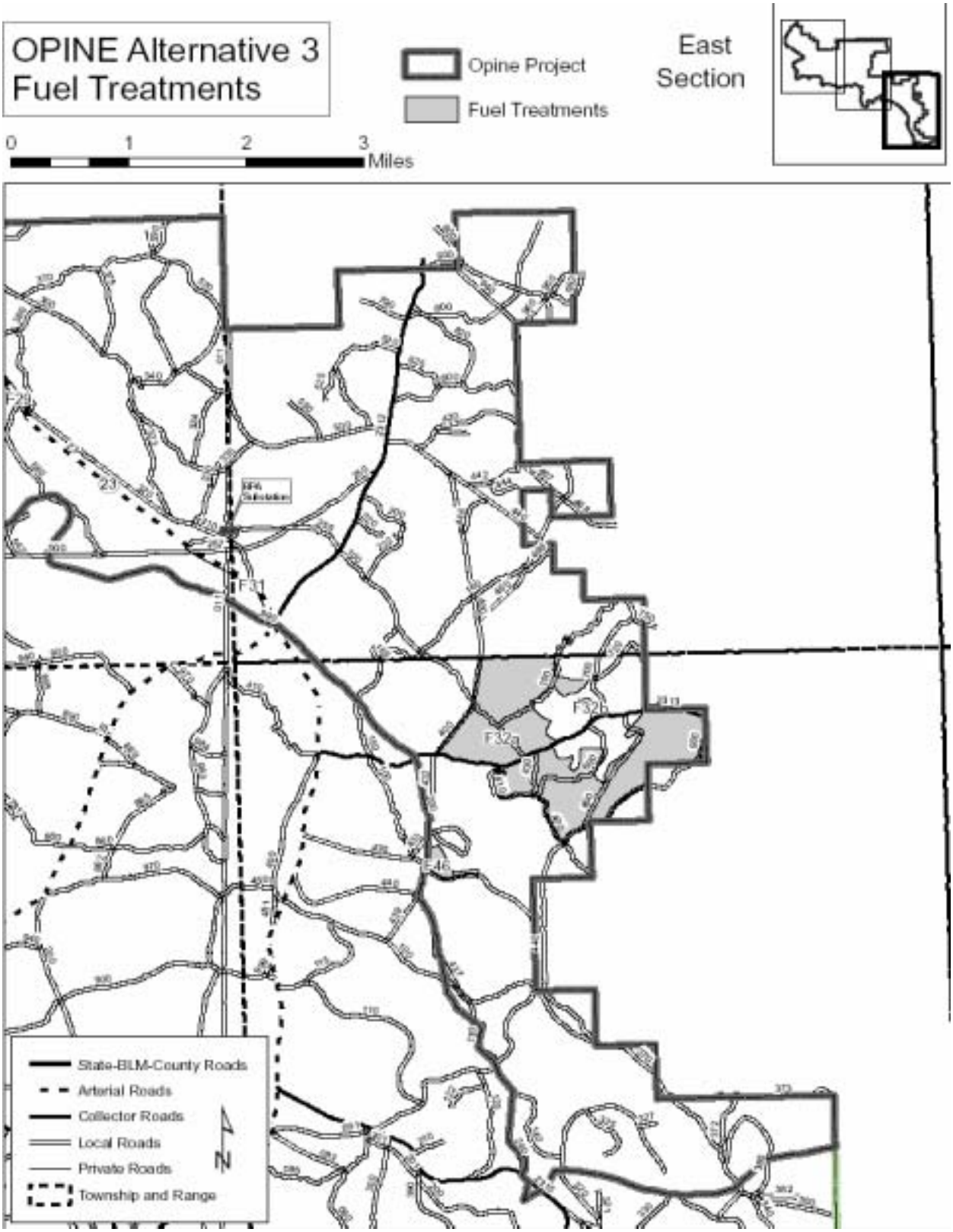


**Figure 2-2c Alternative 3 Fuel Treatment Units – Sand Springs.**



## Roads

To reduce habitat fragmentation and mitigate both the reduction of hiding cover and the low levels of thermal cover, approximately 42 miles of existing system roads would be either closed or decommissioned (Table 2-5) and Figures 2-3a-c). Approximately 28 miles of roads would be closed. Closed roads are not needed for current management, but are expected to be needed for future management activities. Closed roads could be used for administrative purposes (permit administration, fire suppression, etc.) or by permittees under permit such as for grazing.

Approximately 14 miles of system roads would be decommissioned. Decommissioned roads are not needed for current or future management activities and are not used for administrative needs. Decommissioning involves removing the road from the transportation system and often includes subsoiling to make the road impassible to motorized vehicles. Four roads identified for decommissioning also provide access to grazing facilities or improvements – fences, water sets, or trend plots. These include 2300-080, 2017-400, 2017-540, and 2017-543. Segments providing access to those facilities or improvements would not be subsoiled until such time as the facilities or improvements were removed or access no longer required. Two roads, 2300-080 and 2017-400, in addition to providing access to water sets, fences and a trend plot, are also proposed for incorporation into a class II OHV designated trail under another project. Of the approximately 14 miles of system road proposed for decommissioning, approximately 10 miles would be subsoiled.

**Seasonal Administrative Closure (Alternative 3)**

Seasonal closures on roads and motorized trails would be implemented between December 1 and March 31 of the following year after the vegetation and fuel reduction treatments to mitigate the effects and reduce the harassment of wildlife, particularly deer, during critical winter months. The closure would be implemented in areas impacted by management activities including both timber harvest and fuel reduction treatments. It would not be applied to designated trails within the East Fort Rock OHV area.

All roads, except those listed in Table 2-4, would be closed to motorized use during this period. Closures would be implemented upon completion of vegetation and fuel treatment activities in those areas. This would reduce road densities to or below the 2.5 mile per square mile density prescribed in the LRMP for mule deer winter range (S&G M7-22, LRMP page 4-115).

**Table 2-4 Open System Roads by Winter Range Habitat Unit during the December 1 to March 31 Seasonal Closure.**

| WRHU | Tepee Draw | Potholes | Pine Mountain | Mahogany | Lavacicle |
|---|---|---|---|---|---|
| Open System Roads 12/1 - 3/31 | 18 | 18, 23, 25, 2510 | 2017 | 23, 2312 | 23, 2312, 2312400, 2313 |

Road maintenance activities proposed under Alternative 2 would be the same under this alternative. No road reconstruction would be required on existing system roads. Thirty-seven (37) miles of system roads would have maintenance performed prior to commercial harvest activities to bring them up to standard for log haul. See previous discussion for Alternative 2, Table 2-2 for specific roads.

**Table 2-5 Proposed Road Closures and Decommissioning - Alternative 3.**

| Road Number | Est. No. of Miles | Proposed Status | Comments |
|---|---|---|---|
| *ROADS PROPOSED FOR CLOSURE* | | | |
| 1800510 | 0.33 | Close | Needed for present or future mgmt. |
| 1800540 | 0.48 | Close | Needed for present or future mgmt. |
| 1800560 | 0.42 | Close | Needed for present or future mgmt. |
| 1829250 | 0.99 | Close | Needed for present or future mgmt. |
| 2016600 | 1.11 | Close | Needed for present or future mgmt. |
| 2017130 | 0.31 | Close | Needed for present or future mgmt. |
| 2300206 | 0.66 | Close | Close past camp. Needed for present or future mgmt. |
| 2300324 | 0.68 | Close | Close from 2300370 to 2300300. Needed for present or future mgmt. |
| 2300330 | 0.37 | Close | Needed for present or future mgmt. |
| 2300375 | 0.79 | Close | Needed for present or future mgmt. |
| 2312150 | 0.93 | Close | Needed for present or future mgmt. |
| 2312160 | 1.29 | Close | Needed for present or future mgmt. Close from 100 to 460. |
| 2312200 | 1.84 | Close | Needed for present or future mgmt. Close from 2312200 to 2312. |
| 2312220 | 0.57 | Close | Needed for present or future mgmt. Close from 200 to 222. |
| 2312250 | 1.49 | Close | Needed for present or future mgmt. Close from 2312 to 255. |
| 2312257 | 0.82 | Close | Needed for present or future mgmt. Close from 23 to 620. |
| 2312444 | 0.31 | Close | Needed for present or future mgmt. |
| 2312500 | 3.86 | Close | Needed for present or future mgmt. Close from 011 to 2300370. |
| 2312520 | 1.34 | Close | Needed for present or future mgmt. |
| 2312530 | 0.44 | Close | Needed for present or future mgmt. |
| 2312625 | 0.45 | Close | Needed for present or future mgmt. Close from 2312 to 620. |
| 2312800 | 1.73 | Close | Needed for present or future mgmt. |
| 2313430 | 0.42 | Close | Needed for present or future mgmt. |
| 2313800 | 1.25 | Close | Needed for present or future mgmt. |
| 2315100 | 1.78 | Close | Needed for present or future mgmt. |
| 2315370 | 2.23 | Close | Needed for present or future mgmt. Close from 371 to 100 Roads. |
| 2510390 | 0.53 | Close | Needed for present or future mgmt. |
| Miles Closed | 27.42 | | |
| *ROADS PROPOSED FOR DECOMMISSIONING* | | | |
| 1800511 | 0.22 | Decommission | Decommission beyond dispersed camp - not needed for present or future mgmt. |
| 1829240 | 0.14 | Decommission | Not needed for present or future mgmt. |
| 1829270 | 0.12 | Decommission | Not needed for present or future mgmt. |
| 2016240 | 0.20 | Decommission | Not needed for present or future mgmt. |
| 2016300 | 0.22 | Decommission | Decommission beyond dispersed camp - not needed for present or future mgmt. |
| 2016510 | 0.19 | Decommission | Not needed for present or future mgmt. |
| 2017135 | 0.20 | Decommission | Not needed for present or future mgmt. |
| 2017400 | 3.81 | Decommission | Proposed for class II OHV trail designation. |
| 2017440 | 0.48 | Decommission | Not needed for present or future mgmt. |
| 2017445 | 0.21 | Decommission | Not needed for present or future mgmt. |
| 2017540 | 0.52 | Decommission | Decommission beyond gate/fence; not needed for present or future mgmt. |
| 2017543 | 0.42 | Decommission | Decommission beyond water set loop; not needed for present or future mgmt. |
| 2017545 | 0.07 | Decommission | Not needed for present or future mgmt. |
| 2300080 | 0.42 | Decommission | Decommission beyond fence line - not needed for present or future mgmt Proposed for class II OHV trail designation. |
| 2300125 | 0.64 | Decommission | Decommission from 23 Road to 2300365 junction - not needed for present or future mgmt. |

| Road Number | Est. No. of Miles | Proposed Status | Comments |
|---|---|---|---|
| 2300320 | 1.84 | Decommission | Decommission from 23 Road to 2300308 junction - not needed for present or future mgmt. Recommended for Conversion to OHV trail |
| 2300360 | 1.12 | Decommission | Decommission from 23 Road to 2300365 junction - not needed for present or future mgmt. |
| 2312422 | 0.28 | Decommission | Not needed for present or future management. |
| 2312446 | 0.40 | Decommission | Not needed for present or future management. |
| 2312525 | 0.34 | Decommission | Not needed for present or future management. |
| 2312590 | 0.35 | Decommission | Not needed for present or future management. |
| 2312952 | 0.23 | Decommission | Not needed for present or future management. |
| 2313410 | 0.27 | Decommission | Not needed for present or future mgmt. |
| 2313810 | 0.14 | Decommission | Not needed for present or future mgmt. |
| 2315327 | 0.17 | Decommission | Not needed for present or future mgmt. |
| 2510084 | 0.18 | Decommission | Not needed for present or future mgmt. |
| 2510120 | 0.41 | Decommission | Not needed for present or future mgmt. |
| 2510140 | 0.27 | Decommission | Not needed for present or future mgmt. |
| 2510158 | 0.12 | Decommission | Not needed for present or future mgmt. |
| 2510160 | 0.22 | Decommission | Not needed for present or future mgmt. |
| Miles Decommissioned | 14.2 | | |

**Figure 3-1a Alternative 3 Road Closures and Decommissioning – Tepee Draw**

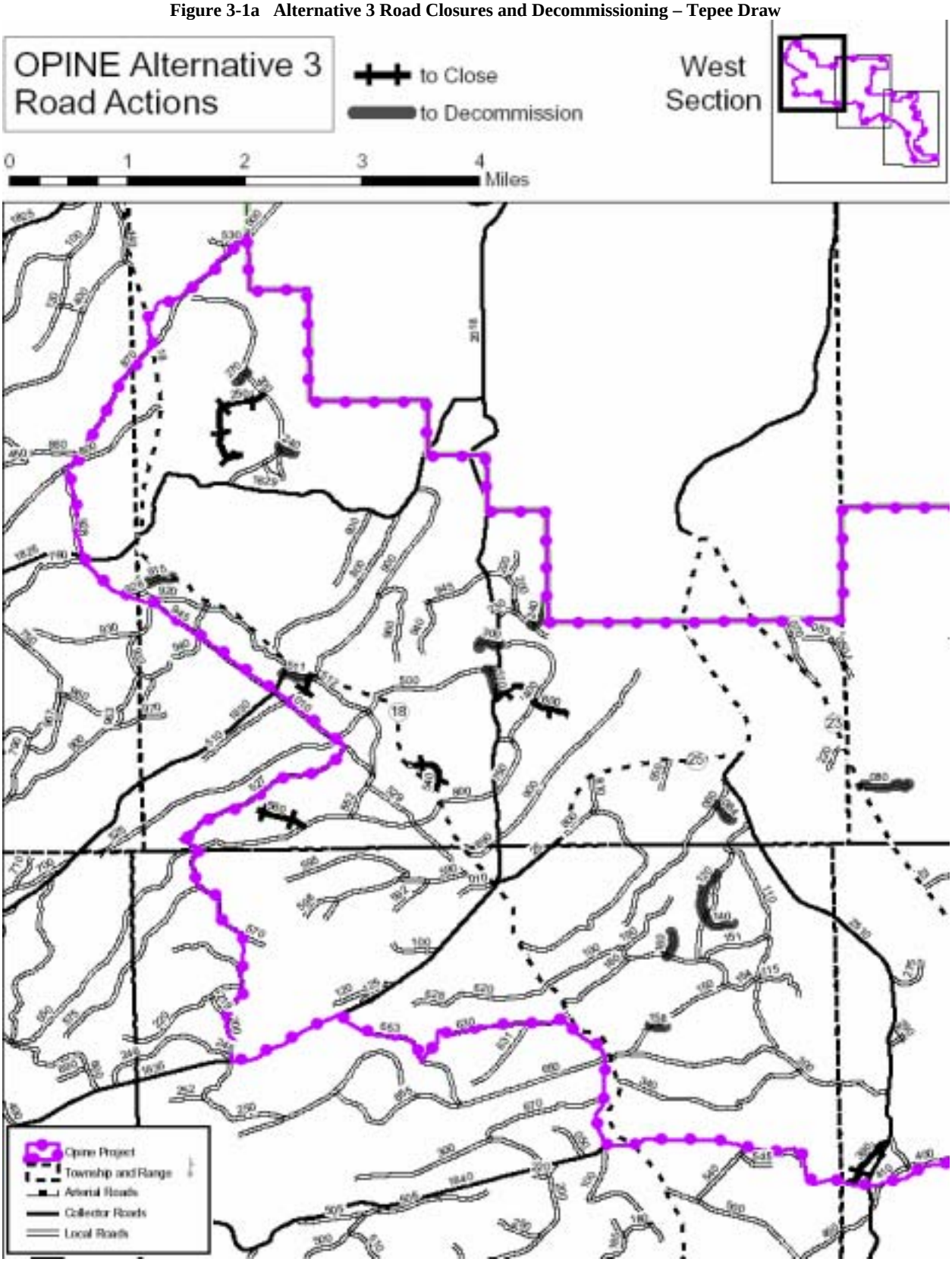


**Figure 3-1b Alternative 3 Road Closures and Decommissioning – Pine Mountain**

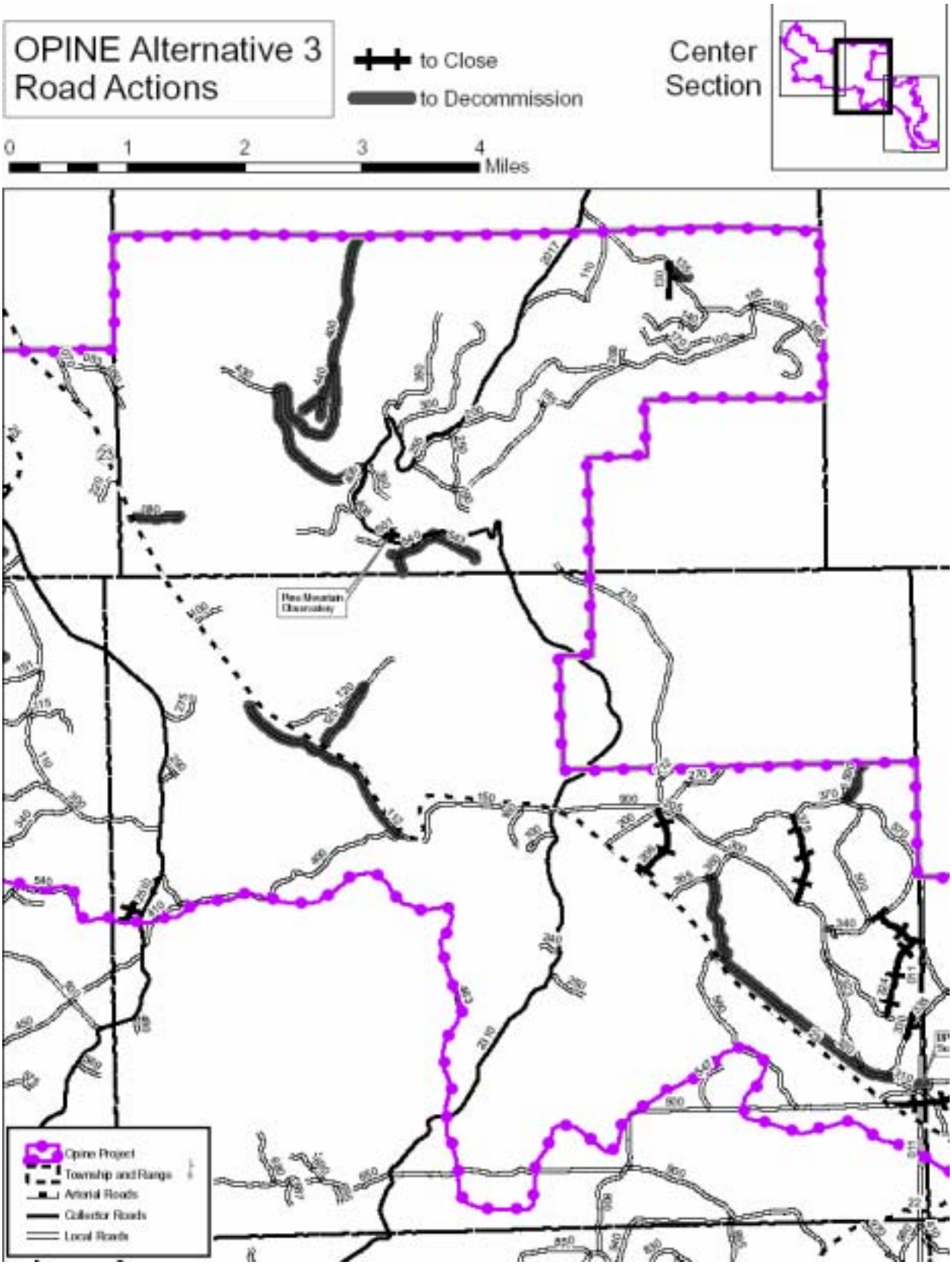
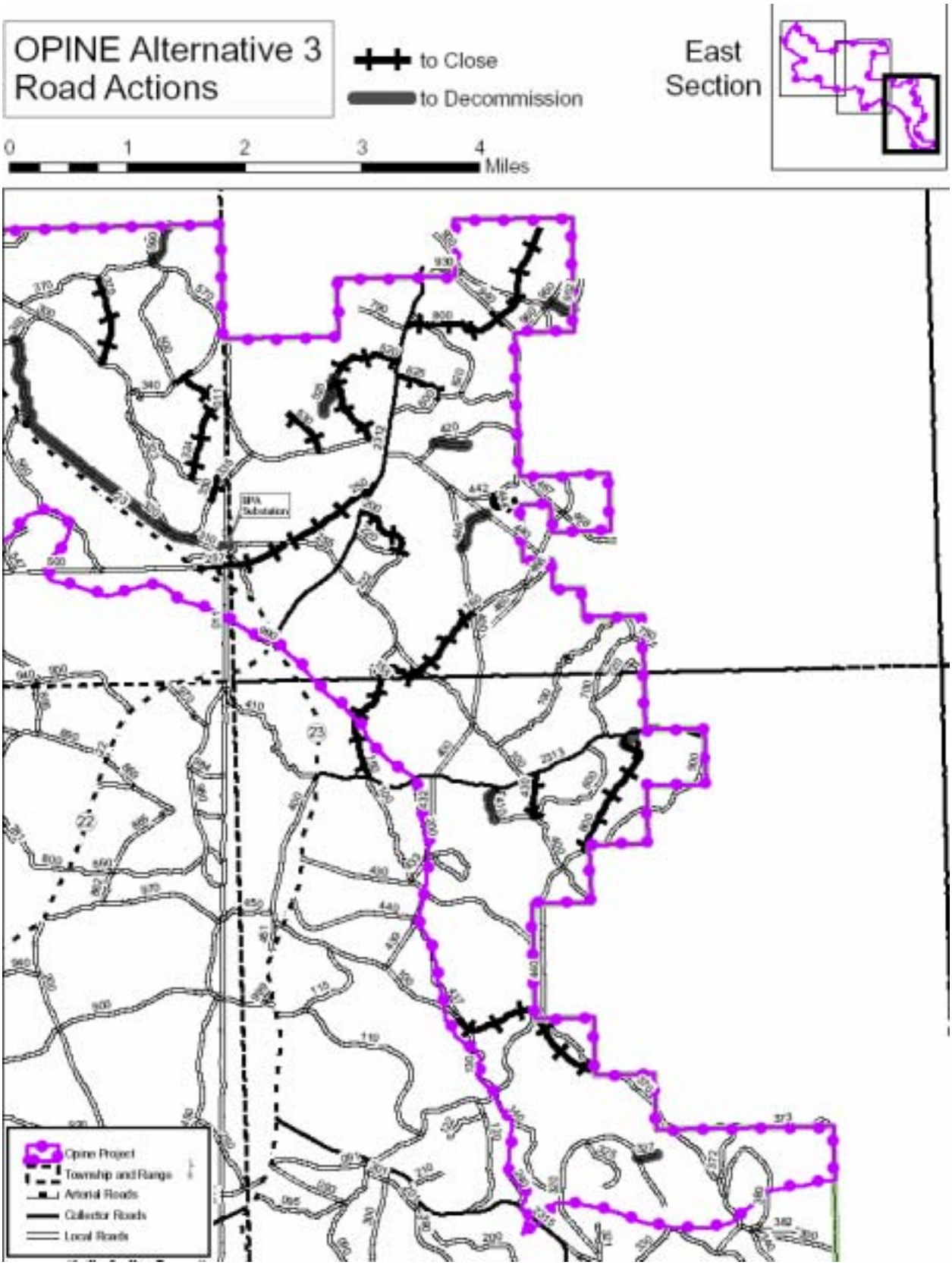


**Figure 3-1c Alternative 3 Road Closures and Decommissioning – Sand Springs**



## COMPARISON OF THE ALTERNATIVES

**Description of Treatments Similar to Alternatives 2 (Proposed Action) and 3:** Table 2-6 describes the treatments that are proposed and overall objectives for these treatments.

**Table 2-6 Description of Thinning and Fuels Treatments and their Objectives.**

| TREATMENT TYPE | TREATMENTS | OBJECTIVES |
|---|---|---|
| **Fuel Treatment Only** | Mechanical Shrub Treatment[20]; Underburn[21] Pretreatment[22] | Reduce natural fuels to reduce risk of wildfire; Provide fuel break/safety corridor; Create strategic fuel breaks including along the wildland/urban interface; Reintroduce fire into fire-associated ecosystem. |
| **Vegetation Treatment with Planting or Seeding** | Commercial Harvest[23]; Non-commercial Harvest[24]; Mechanical Shrub Treatment; Underburn; Subsoil; Planting or Seeding; Trap Gophers; Tube Seedlings | Reduce natural fuels to reduce risk of wildfire; Promote deer hiding cover and vertical stand diversity; Maintain or increase ponderosa pine dominance; Maintain/accelerate ponderosa pine growth; Promote open, park-like stands; Reduce the risk of bark beetle attack. |
| **Vegetation Treatment with no Planting or Seeding** | Commercial Harvest; Non-commercial Thinning; Mechanical Shrub Treatment; Underburn; Subsoiling; Removal of Encroaching Trees | Reduce risk of bark beetle attack; Maintain/ accelerate ponderosa pine growth; Promote open, park-like stands; Reduce natural fuels to reduce risk of wildfire; Provide fuel break/safety corridor; Create strategic fuel breaks |
| **Non-commercial Harvest** | Non-commercial Thinning; Mechanical Shrub Treatment; Underburn | Reduce natural fuels to reduce risk of wildfire; Reduce the risk of bark beetle attack; Provide fuel break/ safety corridor; Create strategic fuel breaks; Improve forest health. |

[20] **Mechanical Shrub Treatment:** mowing of shrubs using a wheeled or crawler tracker leaving vegetation at a height of not less than six to eight (6-8) inches.

[21] **Underburn:** burning of vegetation, generally shrubs, small trees, grasses, and slash materials beneath overstory trees. Usually done after the felling of understory trees (trees generally less than four (4) inches in diameter measured 4.5 feet above the ground (dbh). Includes the burning of vegetation beneath and within the dripline of overstory trees.

[22] **Pretreatment** cutting of trees four (4) inches dbh and smaller prior to applying other fuel reduction treatments such as mowing or burning.

[23] **Commercial Harvest:** removal of trees to 21 inches DBH under a commercial timber sale contract. May include regeneration harvest – clearcut or shelterwood – for the purpose of regeneration by either planting or natural seeding; or thinning for the purpose of maintaining/enhancing growth and individual tree and stand health by reducing stocking to desired/specified levels. Trees exhibiting poor vigor, infected with disease, or subject to or being attacked by insects are priorities for removal.

[24] **Non-commercial Harvest:** removal of trees less than eight (8) inches DBH to desired/specified stocking levels and may include the removal of trees to 16 inches DBH. Trees may be felled by hand (chain saws) or with other equipment. Market conditions may permit the removal of small diameter wood through a commercial timber sale contract.

Table 2-7 provides a tabular comparison of actions proposed under each alternative, including Alternative 1 – No Action. All acreages, volumes, and distance figures are approximate. Unless otherwise noted, figures listed are acres.

**Table 2-7 Alternative Comparison.**

| TREATMENT TYPE | ALTERNATIVE COMPARISON | | |
|---|---|---|---|
| | ALTERNATIVE 1 | ALTERNATIVE 2 | ALTERNATIVE 3 |
| ***ESTIMATED HARVEST VOLUME*** | | | |
| Gross Vol. MBF | 0 | 5,937 | 5,650 |
| Gross Vol. CCF | 0 | 11,568 | 11,000 |
| Commercial Vol. - MBF | 0 | 5,229 | 5,123 |
| Commercial Vol. - CCF | 0 | 10,178 | 9,963 |
| Non-Commercial Vol. - MBF | 0 | 708 | 523 |
| Non-Commercial Vol. - CCF | 0 | 1,390 | 1,040 |
| | | | |
| ***VEGETATION TREATMENTS*** | | | |
| **Small & Medium Tree harvest (Trees 8-21 inches DBH)** | | | |
| Commercial Harvest w/Non-Commercial Harvest | 0 | 2,355 | 2,210 |
| W/Subsoiling | 0 | 24 | 44 |
| Slash Treatment | | | |
| Lop & Scatter | 0 | 2,329 | 2,072 |
| None | 0 | 175 | 138 |
| Fuel Treatment | | | |
| Underburn | 0 | 908 | 478 |
| Burning beneath Dripline | 0 | 632 | 1,713 |
| Machine Pile & Burn | 0 | 43 | 0 |
| None | 0 | 135 | 19 |
| | | | |
| Commercial Harvest w/o Non-Commercial Harvest | 0 | 1,620 | 1,645 |
| W/Subsoiling | 0 | 3 | 3 |
| Slash Treatment | | | |
| Lop & Scatter | 0 | 1,468 | 604 |
| None | 0 | 152 | 1,041 |
| Fuel Treatment | | | |
| Underburn | 0 | 794 | 253 |
| Burning beneath Dripline | 0 | 691 | 178 |
| None | 0 | 783 | 1,214 |
| | | | |
| Regeneration Harvest | 0 | 146 | 0 |
| W/Subsoiling | 0 | 22 | 0 |
| Slash Treatment – Machine Pile & Burn | 0 | 146 | 0 |
| W/Planting[25] | 0 | 49 | 0 |
| W/Natural Regeneration | 0 | 108 | 0 |
| | | | |

[25] Includes approximately ¼ acre within the boundaries of the Pine Mountain Observatory special use permit area. Alternative 2 also includes planting approximately 11 acres of existing openings.

| | ALTERNATIVE COMPARISON | | |
|---|---|---|---|
| **Small Tree Thinning (Trees Less than 8 inches dbh)[26]** | | | |
| **Non-Commercial Harvest** | **0** | **2,347** | **3,263** |
| **W/Subsoiling** | **0** | **10** | **1** |
| **Slash Treatment** | | | |
| **Lop & Scatter** | **0** | **2,347** | **3,263** |
| **Fuel Treatment** | | | |
| **W/Underburn** | **0** | **2,002** | **3,058** |
| **W/Burning beneath Dripline** | **0** | **285** | **175** |
| **None** | **0** | **60** | **31** |
| | | | |
| **SUBTOTAL[27]** | **0** | **6,468** | **7,118** |
| ***FUEL REDUCTION TREATMENTS[28]*** | | | |
| **Pretreat & Underburn** | **0** | **9,553** | **5,658** |
| **Pretreat, Machine Pile, Burn Piles, & Mow** | **0** | **147** | **101** |
| **Pretreat, Hand Pile, Burn Piles, & Underburn** | **0** | **2,140** | **341** |
| **Pretreat, Mow, & Underburn** | **0** | **307** | **138** |
| **Mow** | **0** | **192** | **83** |
| **Mow & Underburn** | **0** | **133** | **305** |
| **Tree Removal (9 inch dbh and smaller0 by Hand Felling or Mowing** | **0** | **335** | **63** |
| **Underburn** | **0** | **5,299** | **1,544** |
| **Underburn Beneath Tree Dripline** | **0** | **2,064** | **1,875** |
| **SUBTOTAL[29]** | **0** | **20,170** | **10,108** |
| | | | |
| **TOTAL ACRES[30]** | **0** | **26,638** | **17,226** |

[26] Small Tree Thinning units may contain trees of commercial size; i.e., trees larger than 8 inches dbh. Depending on market conditions, commercial removal of wood from within these units may be permitted. The proposed actions include the possibility of such removal occurring.

[27] This figure only includes the gross unit acres proposed for treatment. Many acres have multiple actions such as commercial and non-commercial thinning followed by slash treatment and subsequent fuel reduction treatment such as underburning or burning beneath the dripline of residual trees.

[28] These figures do not include acres previously included under vegetation treatments displayed previously.

[29] This figure only includes the gross number of unit acres. Acres treated with multiple treatments are not duplicated in the total.

[30] These figures represent the sum of the subtotals above. They do not include overlapping treatment acres.

***Effects Summary***

Table 2-8 displays the effects of every of the alternatives as measured by the measurement standards for each issue.

**Table 2-8 Key Issue Comparison of Treatments by Alternative.**

| ISSUE & MEASUREMENT STANDARD | ALT 1 | ALT 2 | ALT 3 |
|---|---|---|---|
| ***Key Issue #1:*** **Effects on Mule Deer Habitat, which include: Vegetation Treatments; and Effects of Open Road and Motorized Trails on Habitat Effectiveness** | | | |
| **Acres of Winter Range Treated** | **0** | **16,436** | **21,007** |
| **Hiding Cover Remaining After Treatment (% / acres)** | | | |
| **Project Area** | **21 /5627** | **8.9 / 2390** | **10.1 / 2691** |
| **Pine Mountain and General Forest Allocation** | **37 / 1782** | **3.6 / 177** | **6.6 / 319** |
| **Thermal Cover Remaining After Treatment (% / acres)** | | | |
| **Project Area** | **9 / 2417** | **2.6 / 690** | **2.7 / 720** |
| **WRHUs** | **8 / 2169** | **2.6 / 665** | **2.5 / 656** |
| | | | |
| **Miles of System Roads Closed or Decommissioned** | **0** | **19** | **42** |
| *Key Issue #2:* Condition of Existing Vegetation | | | |
| **Acres Treated Rated as Moderate/High Risk for Bark Beetle Attack** | **0** | **4,625** | **4,964** |
| ***Key Issue #3:*** **Wildfire Risk** | | | |
| **Acres Treated Rated as Moderate to Extreme Fire Behavior Potential** | **15,659 (existing)** | **15,223** | **11,846** |

## ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

An alternative that would implement vegetation management activities (non-commercial thinning and prescribed fire) without the removal of commercial wood fiber was considered, but eliminated from consideration. This alternative was eliminated from consideration because it would not meet the purpose and need because it limits treatments only to non-commercial thinning and prescribed fire.

Specifically, the Opine Planning Area has determined the need for reductions in natural fuels in shrub and forest stand densities as well as for providing commercially viable wood fiber to support local mills and the local economy. Strategically located commercial thinning units (4,132 acres, Alternative 2 and 3,761 acres, Alternative 3) are integral to meeting the purpose and need and objectives of the project. Eliminating commercial firmwood fiber removal would effectively eliminate the opportunity to reduce fuel loads on 4,132 acres, Alternative 2 and 3,761 acres, Alternative 3 classified as moderate to extreme for fire behavior potential, while exacerbating a worsening forest health trend. The emphasis on fuel reduction activities is intended to reduce risks to desired habitats such as late and old-structured stands, xeric shrublands, and large trees; protect developments such as the Pine Mountain Observatory, electronic sites; transmission lines, range improvements, and other similar improvements and facilities from large-scale wildfire; as well as provide timber and other wood fiber products to contribute to local and regional economies resulting from these activities. By limiting objectives (commercial treatments) outlined in the Purpose and Need for the project, this alternative would not achieve the desired condition.

No other alternatives were identified as a result of scoping or 30-day comment period.

## IMPLEMENTATION GUIDELINES

Alternatives are designed to be consistent with the desired conditions and the standards and guidelines described in the LRMP for each land allocation. Appropriate LRMP Standard and Guidelines and Eastside Screens were applied in the design of the alternatives.

### MITIGATION MEASURES AND MANAGEMENT REQUIREMENTS SIMILAR OR COMMON TO ACTION ALTERNATIVES

These mitigation and management requirements or resource protection measures are an integral part of the action alternatives. Mitigation measures are specific actions that could be taken to minimize, avoid or eliminate potentially significant impacts on the resources that would be affected by the alternatives, or rectifying the impact by restoring the affected environment (40 CFR 1508.02). Management requirements are also mitigation measures typically derived from LRMP standards and guidelines, but other sources can also be existing laws or regulations, or guidelines for practices required by extraordinary conditions.

**Botany**

***Proposed, Endangered, Threatened, and Sensitive Plant Species***

**Alternative 2**

1. Flag populations of green-tinged paintbrush in the following fuel treatment units prior to treatment: F01-F05, F07-F10, F13, F17, F18, F21, F22, F33, and F37-F39 and the following vegetation treatment units: P15 and H01. Avoid flagged areas with treatment operations including fireline construction. Implementers will coordinate with botanist during layout and prior to treatment.

2. The green-tinged paintbrush population adjacent to or on the boundary of fuel treatment Unit F11 will be identified for the implementing crew. To protect the populations, the unit boundary may be moved or the populations flagged by the district botanist and those sites avoided during treatment implementation.

3. The populations of green-tinged paintbrush in range treatment Unit R2B will be flagged out prior to treatment and coordination will occur between the botanist and the implementers.

4. In fuel treatment unit F29, keep all treatments away from the pumice grape fern population. The population will be flagged prior to treatment to avoid population and coordination will occur between the botanist and the implementers.

**Alternative 3**

1. Flag populations of green-tinged paintbrush located within the boundaries of the following fuel treatment units prior to treatment: F01, F03-F05, F10, F13, F17, F21, F22, F33, F37-F39 and the following vegetation treatment units: P309, P325, C301, and C303. Within vegetation units, include flagged populations within leave areas or leave out of the unit entirely, depending on plant location. Avoid flagged areas with treatment operations including fireline construction. Implementers will coordinate with botanist during layout and prior to treatment.

2. The green-tinged paintbrush population adjacent to or on the boundary of fuel treatment units F07, F09, and F18 will be identified for the implementing crew. To protect the populations, the unit boundary may be moved or the populations flagged by the district botanist and those sites avoided during treatment implementation.

3. Green-tinged paintbrush in vegetation treatment units P325, P309, C303, and C301 will be flagged out prior to treatment and be considered as a leave (no treatment) area or entirely excluded from the unit.

4. Ensure that the treatment of fuels Unit F29 does not enter the pumice grape fern population. The population will be flagged out prior to treatment and coordination will occur between the botanist and the implementers.

***Invasive Plants (Common to Alternatives 2 and 3)***

1. Machinery used in the harvest activities and fireline construction must be washed prior to entry into the project area. Use the timber sale contract equipment washing clause to reduce the possibility of importing noxious weeds to the area.

2. Machinery involved in project activities must be washed prior to going and leaving the project area.

3. If equipment is leased or contracted to implement prescribed burns, the standard equipment cleaning clause will be used.

4. The district botanist will identify and flag areas of weed infestation for implementers to avoid.

5. Fuels treatment areas with known weed infestations and other areas outside treatment areas will be monitored for weed invasions.

6. To avoid spreading weeds at known sites during prescribed burning the district botanist will provide a map for choosing staging areas prior to ignition for fuels personnel.

7. Personnel involved with the implementation of fuels treatment units will be taught to identify cheatgrass and informed to avoid dense patches during treatments.

***Invasive Plants (Only Alternative 3)***

1. Small openings in Alternative 3 only, will be created in three units in Tepee Draw (unit numbers C316, C317, and C320**)** to promote deer forage production in the deer winter range management area; these will be away from roads (where weeds commonly establish themselves) where possible. Personnel involved in implementation will coordinate with the District Botanist to ensure that there are no known weeds in those areas.

**Wildlife**

**Alternative 2**

To mitigate the effects of vegetation (commercial and non-commercial thinning) and fuel reduction treatments on mule deer hiding, and thermal cover, close approximately 3.0 miles and decommission approximately 16 miles of existing system roads.

**Alternative 3**

To mitigate the effects of vegetation (commercial and non-commercial thinning) and fuel reduction treatments on mule deer, hiding, and thermal cover:

1. Close approximately 28 miles and decommission approximately 14 miles of existing system roads.

2. Implement a closure order to close roads from December 1st to March 31st of the following year to reduce road densities to 2.5 miles per square mile or less where vegetation and/or fuel reduction treatments have been completed.

***Big Game Cover/Forage:***

**BG1-**Deer hiding/thermal cover – For **Alternative 2** retain 10 percent or for **Alternative 3** retain 20 percent in untreated patches from ½ to 6+ acres in size in all units where treatments effect tree cover/density, including fuels "pre-treatments", non-commercial thinnings, and prescribed fire applications. Identify, mark, and protect the retention clumps from thinning, harvest equipment impacts, and prescribed fire. An emphasis shall be placed on thermal cover (MA7 objective, Standard and Guidelines (S&Gs) TM 55 and 56, WL-74) and all classified optimal thermal cover will be protected in Alternative 3 units including C321, C322, and C334. Reference Mitigation Measure NG7).

**BG2-**Deer travel and LOS connectivity corridors will be provided that are 600 feet wide (400' minimum). Thinning of corridors should only be done in order to reduce current significant risks to insect/disease vectors and/or risk of catastrophic fire. In those corridors planned for thinning, retain at a minimum 10 percent (alt. 2) or 20 percent (alt. 3) of the corridor's area in suitable hiding cover (or the best available) in well distributed clumps ½ acre or larger. Where corridors overlay units, the 10 percent or 20 percent of cover retention is applicable to the corridor's area within a unit's boundary, and is not part of the calculated overall unit's objective of hiding cover retention (S&G WL-56). **Alternative 2 units with corridors include**: H 01, 02, 04, 11, 12, 16, 20, 22, 23, 24, 27, 28, 30, 31, 33, 37, 39, 40, and 42; P 03, 05, 07, 12, 15 17, and 21; SD 02, 04, and 08; F 01, 03, 04, 05, 08, 09, 11, 13, 16, 18, 19, 20, 21, 22, 25, 26, 28, 29, 32, 34, and 40. **Alternative 3 units with corridors include**: C 301, 302, 307, 309, 312, 315, 322, 323, 324, 329, 330, 334, 336, 337, and 338; P 301, 302, 303, 308, 314, 315, 316, 324, 328, and 329; F 01, 03, 04, 05a,b, 09d, 13, 14b, 17a,b,c, 18, 20b,c, 21, 23a, 28, 29, 32, 33, 34, 38b, 41 and 46.

**BG3-**Where possible, hiding cover screens will be left along open roads. Recommended for all roads within treatment units and outside of the Scenic Area allocation. Where available, screens should be at least 50 feet in width (length will vary by size of unit along road) (S&G M-58). The screen may be off-set from the edge of the road to improve public and fire fighter safety.

**BG4-**Roads/motorized trail density within the winter range management area that is in excess of the M7-22 S&G of 1.0 to 2.5 miles of road per square mile, should be closed. Seasonal closures should be employed both during the hunting season (i.e. Green Dot system) and during the wintering period (S&G, M7-23).

**BG5-**In mechanical mowing units leave a minimum shrub height of 6 to 8 inches. Mowing should be limited to reducing ladder fuels under tree canopies and not be done in open xeric shrublands or shrub patches in treeless openings. In particular, retain shrubs near down logs, stumps, rocky outcrops, cliffs, and lava ecotones (S&G WL-75; reference the IFMS).

**BG6-** All mowing and burning treatments in MA7 and biological winter range will leave 20 to 50 percent of the shrubs untreated. The retention patches in BG1 may be included in this percentage. Retention patches of shrub should be well distributed across the unit in a mosaic pattern. They may be located in rocky areas on steeper slopes, or other areas less favorable to mowing or burning activities. Untreated patches will range in size from 1/10th to 6 acres.

**BG7-**Reduce impacts to xeric shrublands and to the mid-age/structure class of bitterbrush by limiting natural fuels treatments in these areas, by the modifications of prescriptions (e.g. change broadcast burns to dripline burns), or modification of lighting procedures. (S&G M7-14; reference the IFMS) Consult with the District Wildlife Biologist prior to treatments to identify the areas of concern. **Alternative 2 units** include:F02, 04, 05, 06, 09, 12, 13, 15, 16, 18, 20, 21, 22, 23, 25, 26, 34, 36, 37, 38, and 39. **Alternative 3 units** include: F01, 04, 05b, 06, 09b, 09c, 13, 20b, 20c, 21, 23a, 24, 34, 36a, 38a, 38b, and 39.

**BG8-**For natural fuels treatments on ridgelines within winter range avoid burning mature shrubs in the ecotone (i.e. the edge between the forest and xeric shrub habitats; S&G WL-75, Mitigation Measure). This mitigation measure applies to the following **Alternative 2 units:** F01, 04, 07, 09, 10, 11, 12, 17, 18, 22, 37, 38, and 39. **Alternative 3 units**: F01, F04, F09d, F11, F17a, b, c, F18, F38a,b,d, and F39.

**BG9-**Protect from all treatment activities mountain mahogany patches (S&G WL-75; reference the ICB Draft Eastside EIS- HA-S10).

**BG10-**Only re-treat (in the next 5 to 10 years) prescribed burn/mow areas after an interdisciplinary review with ODFW determines that a re-burn is needed and that other resource objectives are not being compromised, such as regeneration of deer forage shrubs (S&G M7-14). This mitigation measure applies only to the following **Alternative 3 units:** F13 (42%), F14 (14%), F21 (42%), F23, F27 (40%), F28, and F35 (10%). The following units with past treatments that may be re-treated, but limited to dripline burning only: F05 (44%), F15, F20 and F34.

**BG11-**Limit the amount of prescribed burning treatments to meet the allowable annual 2.0 to 2.5 percent treatmented in Deer habitat (S&G M7-26). The Forest has determined that this restriction applies to ODFW deer herd units (i.e. North Paulina). Treatments will take into account previously approved treatments from other overlapping planning areas such as Fuzzy and a portion of the Sisters RD) (S&G M7-26).

**BG12-**Restrict the amount and duration of disturbance within all units in deer winter range between December 1st. thru March 31st. each year by limiting the scope and duration of vegetation and fuels management activities including contract logging (S&G M7-23). Consult the District Wildlife Biologist prior to implementation in order to determine the best methods to reduce disturbance.

**BG13-**Limit the size of treatment units to 300 to 500 acres (including un-treated islands) for all treatments that impact mule deer forage within Deer Habitat. If more than one unit is treated in a single year, treatment units should be 600 to 1,200 feet apart (MA7-15).

**Non-Game Species/Habitats:**

**NG1-**Limit fuel treatments (i.e. mowing and prescribed burns) that may adversely affect ground-nesting birds to the periods outside of April 1 thru July 30 (reference Regional guidance, Executive Order, Migratory Bird Treaty Act).

**NG2-**For natural fuels treatments in forested lavas prescribe tree dripline burns to create a mosaic of burned and unburned habitats or employ fuel breaks along the perimeter of the treatment area (reference the IFMS; S&G M7-14, 25). Conduct surveys in forested lavas with sinks and in adjacent cliff habitats for Townsend's big-eared bats prior to treatments. Bat occupancy may

limit treatment options (S&G WL-67). This mitigation measure is primarily applicable to **Alternative 2** in Unit F03.

**NG3-**Activities near known or discovered raptor nests must observe the seasonal restrictions, including the Pine Mountain goshawk site and the Pine Mountain golden eagle site (S&G WL-3, 11, 19, 28). This mitigation measure applies to the following **Alternative 2 units**: H 03, 04, 09, 41; P 02, P03; SD 02; F01 06, 09 32. **Alternative 3 units**: C 303; P 302, 303, 304, 346; F 06, 09b, 32a. Goshawk surveys will be required prior to treatments in units near Plot Butte. Restrictions will be waived if a nest is inactive.

**NG4-**Retain/protect (exceptions for safety) all soft and hard snags (S&G WL-37, 38, M7-12, M9-33; reference DNF WLTL Strategy, Eastside Screens). Provide logs and down wood (S&G WL-63, 72, 73 and Eastside Screens) and minimize charring from prescribed fire. Where down logs and wood are below the minimum requirements retain/protect available slash piles to meet the needs (S&G WL-72, Eastside Screens). Retention piles should be clearly marked/signed and mapped. Within lodgepole pine habitat types leave, where available, concentrations (i.e. natural or piles) of down materials at the rate of one per acre for pine (American) marten (S&G WL-63, including size specifications). This mitigation measure applies to the following **Alternative 2 units**: H 29, 30, 31, 32, 33, 34, 35, 37; F30. **Alternative 3 units** include: C 329, 333, 334, 335; P 341, 342, 343, 344.

**NG5-**Retain green tree replacements for future snag and log recruitment. Provide an array of sizes of trees with an emphasis on the larger size classes. A minimum diameter of 12 inches dbh in ponderosa pine habitat is required, but trees at least 21 inches in diameter are the emphasis. At a minimum, provide 8 trees per acre in excess of 21 inches diameter through time in ponderosa pine habitats. In lodgepole pine habitats provide trees with a minimum diameter of 10 inches at a density of at least 24 per acre (reference Eastside Screens and DNF WLTL Strategy).

**NG6-**Provide habitat to maintain the Pine Mountain northern goshawk pair by designating 30 acres of nesting habitat and 400 acres of post fledging area (PFA) around the nesting habitat. No commercial harvest can occur within the nest site, but non-commercial thinning is allowable. Within the PFA, commercial harvest may occur provided that it promotes LOS objectives and maintains goshawk foraging habitat attributes (reference Eastside Screens).

**NG7-**Retain a minimum of 10 percent fro Alternative 2 or 20 percent for Alternative 3 in untreated patches of trees from ½ to 6+ acres in size in all units where treatments affect tree cover/density to provide vertical and horizontal diversity in stand structure. Identify, mark and protect the retention clumps from thinning (including fuels "pre-treatments), harvest equipment impacts, and prescribed fire. Diversity patches may coincide with patches retained for big game hiding/thermal cover reference mitigation measure BG1; S&Gs TM-55, 56).

**LOS/OGMA Habitats:**

**OG/LOS1-**Connectivity between LOS stands will be provided. Canopy cover within LOS connectivity corridors will be maintained at a level equal to or exceeding 50 percent or the top 1/3$^{rd}$. of site potential. Harvest within connectivity corridors is allowable provided that the minimum canopy cover can be maintained (reference Eastside Screens).

**OG/LOS2-**Protect all known LOS stands.

**OG/LOS3-**Protect all existing trees 21 inches in diameter or greater (reference Eastside Screens).

**OG/LOS4-**Prepare management plans for Old Growth Management Areas (completed November, 2004 for Pine Mountain and Pumice Springs OGMAs) in need of special treatment measures (reference the LRMP Implementation Schedule, Appendix 15).

**Special/Unique Habitats:**

**S/U1-**Protect the ecotone areas where forested habitats are adjacent to cliffs, rock outcrops, springs, forested lavas, lava tubes, and caves by providing a buffer where vegetation management activities would occur. The buffer width will be determined on a site-by-site basis by operations staff and the biologist, but generally it will range from 30 to 50 feet for rock outcrops to 300 feet for caves (S&G WL-70, 75). This mitigation measure applies to the following **Alternative 2 units:** F 01 (sage, rock opening), 03 (forested lavas), 10 (rocky, low sage), 18 (cliffs), 22 (cliffs), and 38 (sage, rock opening). **Alternative 3 units**: F03 (forest lavas, special coordination needed), 04 (rocky, low sage), 09a (sage, rock opening), 18 (cliffs), and 38b (sage, rock opening).

**Note**: Refer to Tables A-5a, A-5b, A-6, and A-7 in the Appendix for unit specific mitigation and implementation measures.

The following section is summarized from the Biological Evaluation in order to facilitate project implementation.

**Scenic Resources and Recreation (Common to Action Alternatives)**

1. Consult with a Landscape Architect to establish unit layout and marking guides in foreground treatment areas on Road 2017 and adjacent to recreation sites. Monitoring is to be completed by a Landscape Architect within one to two years following completion of the proposed treatment and mitigation activities.

2. Flush cut stumps and locate skid trails and landings beyond 300 feet of from Road 2017. Clean-up activities in foreground treatment areas, recreation sites, and main travel routes, which include landings, skid trails, and slash piles. Use a low impact machine or hand piling in recreation sites and within 300 feet from the main roads such as Road 2017. Work should be completed within two years after activity. Retain sufficient quantities of downed logs, snags, and other materials to meet coarse woody debris, snag, and other resource requirements.

3. Avoid scorching above 2/3 of the live crown in prescribed burn units located within foreground treatment areas (within 300 feet of Road 2017). Severely damaged or burned trees shall be removed as part of post-treatment activities within two years.

4. Minimize ground disturbance and damage to vegetation in foreground treatment areas along main travel routes and recreation sites. For larger or more heavily used dispersed camping sites, avoid the immediate area within 100 feet of the center of the camping site and protect from prescribed fire by placing a fire line around the perimeter of the site.

5. Design fuel and vegetation units to minimize ground disturbance and damage to vegetation in foreground treatment areas along main travel routes in order to avoid further exposure of existing livestock trails.

6. Remove safety hazards created from vegetation treatment such as “widow makers” and other unsafe conditions beyond those needed to meet coarse woody debris and snag requirements.

7. Minimize the amount of marking paint that is visible from recreation sites and main travel routes and mark trees on the side of the tree away from the road. Remove all flagging and unit boundary tags when treatment activities are completed in these areas.

**Soils (Common to Action Alternatives)**

1. Minimize the extent of new soil disturbance from mechanical treatments by implementing appropriate design features for avoiding or reducing detrimental soil impacts from project activities. Options include using some or all of the following

   a) Use existing log landings and skid trail networks (whenever possible) or designate locations for new skid trails and landings.

   b) Designated locations for new trails and landings need to best fit the terrain and minimize the extent of soil disturbance.

   c) Maintain spacings of 100 to 150 feet for all primary (main) skid trail routes, except where converging at landings. Closer spacings due to complex terrain must be approved in advance by the Timber Sale Administrator. Main skid trails have typically been spaced 100 feet apart (11 percent of the unit area) from 1994 to present. For the larger activity areas (greater than 40 acres) that can accommodate wider spacing distances, it is recommended that distance between main skid trials be increased to 150 feet to reduce the amount of detrimentally disturbed soil to 7 percent of the unit area (Soils Report, page 35). This would reduce the amount of surface area where restoration treatments, such as subsoiling, would be required to mitigate impacts to achieve soil management objectives.

   d) Restricting skidders and tractors to designated areas; that is, roads, landings, and designated skid trails, and limiting the amount of traffic from other specialized equipment off designated areas. Harvester shears will be authorized to operate off designated skid trails at not less than 30 foot intervals and make no more than two equipment passes on any site-specific area to accumulate materials.

   e) Use of directional felling techniques from pre-approved skid trails, and suspending the leading end of logs during skidding operations.

   f) Avoid equipment operations during times of the year when soils are extremely dry and subject to excessive soil displacement.

   g) Avoid equipment operations during periods of high soil moisture, as evidenced by equipment tracks that sink deeper than during dry or frozen conditions.

   h) Operate equipment over frozen ground or a sufficient amount of compacted snow to protect mineral soil. Equipment operations should be discontinued when frozen ground begins to thaw or when there is too little compacted snow and equipment begins to cause soil puddling damage (rutting).

   i) Limit the width of machine built fireline whenever possible. Redistribute humus-enriched topsoil and pull available organic matter and woody debris over areas of exposed mineral soil in the fireline upon completion of burning activities to mitigate soil displacement and erosion.

2. Restrict mechanical disturbance to designated areas; that is, roads, landings, and designated skid trails, at all times on portions of activity areas that contain sensitive soils with high erosion hazards and/or slopes greater than 30 percent. Require operators to winch logs to skidders with at least 75 feet of bull line. Hand felled trees shall be directionally felled toward pre-approved skid trails, and the leading end of logs shall be suspended while skidding. Exceptions for areas that make up less than 10 percent of an activity area would be subject to Forest Service approval. On slopes steeper than 30 percent, existing temporary roads and primary skid trails (used by the purchaser) shall be reclaimed by applying appropriate rehabilitation treatments. *High Effectiveness.*

   The following activity areas are proposed for mechanical treatment and contain slopes over 30 percent:

   ***Alternative 2*** **-** Units H02, H04, H07, H10, H11, H42, P01, P02, P03, P04, P05, P06, P07, P08, P10, P11, SD01 and SD08. Soil restoration treatments would most likely be needed in Units H02, H07 and P04. None of the activity areas contain soils with high erosion hazards on more than 10 percent of the unit area.

   ***Alternative 3*** **-** Units C302, C303, C305, C307, C339, P301, P302, P303, P304, P306, P308, P309, P310, P311, P312, P314, P315, P316, P317, P318, P319, P321, P322, and P324. Soil restoration treatments would most likely be needed in Unit C302.

   Soils with high erosion hazards that make up more than 10 percent of an activity area - Units P321 and P325.

3. Reclaim specific segments of local system roads, all temporary roads, log landings and primary (main) skid trails by applying appropriate rehabilitation treatments in activity areas where detrimental soil conditions are expected to exceed the Regional Policy guidelines. Decommission (obliterate) logging facilities that will not be needed for future management. Options for mitigating the effects of project activities include the use of subsoiling equipment to loosen compacted soils on temporary roads and logging facilities, redistributing humus-enriched topsoil in areas of soil displacement damage, and pulling available slash and woody materials over the treated surface to establish effective ground cover protection. *High Effectiveness.*

   ***Alternative 2*** **-** Reclaim logging facilities in portions of the following nine (9) activity areas which are expected to exceed allowable limits of detrimental soil conditions following mechanical treatments.

   1. Units - H02, H07, H19, H36, H38, H40, H41, P04 and P19.

   2. Decommissioning (subsoiling) of local system roads - Units H10 (0.2 miles), F29 (1.2 miles) and F40 (0.04 miles).

   3. Reclamation of machine-built fire line in the following Fuel Treatment Units - F01, F07, F18, F38 and F39.

   ***Alternative 3*** - Reclaim logging facilities in portions of the following nine (9) activity areas which are expected to exceed allowable limits of detrimental soil conditions following mechanical treatments.

   1. Units - C302, C303, C305, C308, C314, C324, C332, C336, and C339.

2. Decommissioning (subsoiling) of local system roads - Units P305 (0.2 miles), P317 (0.2 miles), P321 (0.2 miles), F29 (1.2 miles) and F40 (0.04 miles).
3. Reclamation of machine-built fire line in the following Fuel Treatment Units - F01, F07, F18, F38 and F39.

## BEST MANAGEMENT PRACTICES (BMPS)

Appropriate Best Management Practices (BMPs) would be applied to all ground-disturbing management activities, as described in General Water Quality Best Management Practices (Pacific Northwest Region, 1988), a copy of which is available at the Bend-Fort Rock District Office or the Deschutes National Forest Supervisor's Office. These BMPs are tiered to the Soil and Water Conservation Practices (SWCP) Handbook (FSH 2509.22), which contains conservation practices that have proven effective in protecting and maintaining soil and water resource values. The Deschutes Forest Plan states that BMPs will be selected and incorporated into project plans in accordance with the **Clean Water Act** for protection of waters of the State of Oregon (LRMP page 4-69).

1. Use old landings and skidding networks whenever possible. Assure that water control structures are installed and maintained on skid trails that have gradients of 10 percent or more. Ensure erosion control structures are stabilized and working effectively (LRMP SL-1; Timber Management BMP T-16, T-18). *High effectiveness.*

2. In all proposed activity areas, locations for new yarding and transportation systems would be designated prior to the logging operations. This includes temporary roads, spur roads, log landings, and primary (main) skid trail networks. (LRMP SL-1 & SL-3; Timber Management BMP T-11, T-14 & T-16). *Moderate effectiveness.*

3. *Surface Drainage on Temporary Roads* – minimize the erosive effects of concentrated water through the proper design and construction of temporary roads (Road BMP R-7). *Moderate effectiveness.*

4. *Road Maintenance* – conduct regular preventive maintenance to avoid deterioration of the road surface and minimize the effects of erosion and sedimentation (Road BMP R-18, R-19). *Moderate to high effectiveness.*

5. *Protect Soils and Water during prescribed burn operations* – A burn plan addressing compliance with all applicable LRMP standards and guidelines and Best Management Practices will be completed before the initiation of prescribed fire treatments in planned activity areas. Prescribed burn plans need to include soil moisture guidelines to minimize the risk of intense fire and adverse impacts to soil and water resources (LRMP SL-1 & SL-3; Timber BMP T-2, T-3 & T-13; Fuels Management BMP F-2, F-3). *Moderate to High effectiveness*.

6. *Coarse Woody Debris (CWD)/Down Wood* - Retain adequate supplies of coarse woody debris (greater than 3-inches in diameter) to provide organic matter reservoirs for nutrient cycling following the completion of all project activities (LRMP SL-1). It is recommended that a minimum of 5 to 10 tons per acre of CWD be retained on ponderosa pine sites, and 10 to 15 tons of CWD per acre should be retained on mixed conifer and lodgepole pine sites to help maintain long-term site productivity. These amounts are less than the recommended levels for wildlife habitat objectives (Eastside Screen Direction) *Moderate effectiveness.*

**Range**

1. To avoid unwanted disturbances associated with livestock grazing along Road 2017, do not create new landings or skid trails or use existing landings and skid trails that are visible from the road.

2. Protect range improvements and range study plots. Protect fences scheduled for removal to the extent that removal is not affected by treatment activities. Avoid breaking the fence into segments, burying the wire or posts, bending posts, or dragging all or potions of the fence. Table 2-8 displays treatment type (vegetation or fuel), and treatment unit, the range improvements and range study plots to be protected during vegetation and fuel treatment operations. A more complete description can be found in Table 5 (pages 49-53) and Table 8 (pages 57-61) in the Range Report.

3. Avoid existing fences in mechanical treatment units,

4. When prescribed burning avoid or protect fences constructed from primarily wood components or portions of fences constructed primarily of wood components (posts, braces, etc.). Reconstruct fences damaged during treatment using project funds (timber, fire).

5. Involve a range specialist in review of treatment contracts and burning or treatment plans prior to approval and implementation to ensure that range resources are protected as prescribed above.

6. Areas of concern: To maintain healthy rangeland conditions, do not treat non-forested southern or southeastern facing slopes of Pine Mountain with fall burning or with burning intensities that would alter vegetation conditions and cause exotics such as cheatgrass to invade and takeover the site.

7. Units R1A and R1B, (both alternatives) and units R2A, and R2B (Alternative 2) will need vehicle access for implementation of proposed treatments. Some existing access roads will need to remain open or be maintained during treatment.

8. Implementation activities can occur simultaneously with livestock use under most situations by communication with operators and permittees. Closing gates, using increased caution when heavy equipment share roads and being made aware of potential hazards such as livestock in the roadway can generally mitigate activities. Table 2-9 lists specific roads that need additional mitigations to minimize impacts and conflict between vegetation and fuel treatment activities and ongoing grazing activities and improvements.

9. The fire/fuels and range program managers will develop a vegetation management implementation plan that would direct activities to treat only one pasture of each active allotment within the project area in a given grazing season.

**Table 2-8 Alternative 2 Mitigation Measures and Improvement Protection Requirements for existing Range Improvements associated with Proposed Vegetation and Fuel Treatments, Alternatives 2 and 3**

| Treatment | Improvement Type | Mitigation Measures | Units | |
|---|---|---|---|---|
| | | | Alternative 2 | Alternative 3 |
| Vegetation | Barbed Wire Fence | | SD03, SD04, SD05, P09, P10, P14, P15, P16, P22, H01, H10, H11, H12, H22, H24, H25, H38, H39, H40. | P301, P317, P321, P327, P328, P330, P331, P333, P335, P337, P345, C307, C309, C320, C321. C322. C326, C336, C337, |

| Treatment | Improvement Type | Mitigation Measures | Units | |
|---|---|---|---|---|
| | | | Alternative 2 | Alternative 3 |
| | Water Set | Potential cheatgrass site - avoid use during active grazing Leave 25 foot buffer when cheatgrass is present. | SD08, P15, H14, H27, H28. | P333, P334, C308, C325, C32 |
| | Range Study Plot | Flag prior to treatment. Range specialist to be on site during implementation. Read all CT and 3-way enclosures prior to treatment. Alternatively, protect using a 5 acre buffer centered on the actual transect. | SD05, H11, H24, H37. | P330, C307, C320, C334, |
| | Trick Tank | 300 foot buffer around site; clean up all slash | P02 | P302 |
| | Water Storage Tank | | H25. | C320 |
| | Tree Plantation | Protect with "hard" fencing, new improvement construction. | H19, H23 | C314, C319 |
| Fuels | Barbed Wire Fence | | F03, F04, F05, F06, F08, F09, F11, F13, F14, F15, F16, F17, F18, F20, F30, F32, F34, F35, F39, R1A, R1B, R2A, R2B | F03, F04, F05, F06, F09, F11, F13, F14, F15, F16, F17, F18, F20, F30, F32, F34, F35, F39, R1A, R1B, R2A, R2B |
| | Water Set | Potential cheatgrass site - avoid use during active grazing. Leave 25 foot buffer when cheatgrass is present. | F05, F06, F07, F09, F11, F13, F18, F20, F21, F37, R1A, R2A R2B | F05, F06, F07, F09, F11, F13, F18, F20, F21, F37, R1A, R2A R2B |
| | Range Study Plot | Flag prior to treatment. Range specialis to be on site during implementation. Read all CT and 3-way enclosures prior to treatment. Alternatively, protect usin a 5 acre buffer centered on the actual transect. | F05, F20, F23, F38, F40, F43 | F20, F23, F37, F38, F40, F43, |
| | Study Enclosure | No burning/mowing at long-term vegetation study plot including two enclosures. 1500 foot buffer around study area. Range to flag out prior to implementation | F13, F14 | F13, F14 |
| | Water System/Water Line | Avoid driving over eastern shoulder of unnumbered road just east of system Road 2312 400 from intersection with 2313 north to section line of section 33, T21S., R16E. and along east shoulder of Road 437. Avoid putting fire on/over any sections of exposed PVC pipe, water troughs, wooden valve boxes, valves, etc. Do not burn along Road 437. | F32, F46 | F32, F46 |
| | Trick Tank | 300 foot buffer around site; clean up all slash | F01 | F01 |
| | Water Trough | Waterline to be added; subsurface. | F32 | F32 |

**Table 2-9 Road Related Mitigations to Minimize Conflicts with Grazing and Grazing Improvements**

| Action Needed | Affected Roads | Reason/Concern |
|---|---|---|
| Maintain road prior to implementation of vegetation treatments and as needed by livestock operator during the life of the permit. | 1829 200; 2300 080; 2017 540; and 2017 543. | Ongoing use by shared users (Primarily OHV's) while livestock are present. Maintenance of cattle guard near the intersection of the 540 and 543 roads, especially as OHV use continues to increase. |
| Plan vegetation treatment(s)/livestock use at separate times. | 2300 120 | Implementation of vegetation treatment up slope and continued shared OHV use concurrent with livestock use in the South Pasture. Concern is due to condition of existing road, proximity to water set, the shared use of the road as it is used to trail livestock, and in general existing step slopes. |

| Action Needed | Affected Roads | Reason/Concern |
|---|---|---|
| **Plan treatment(s)/livestock use at separate times.** | **2300 125** | **Implementation of vegetation treatment up slope and continued shared OHV use concurrent with livestock use in the South Pasture. Concern is due to condition of existing road, proximity to water set, shared use by OHV users, and steep slopes.** |
| **Closure of this road will rely on the fact that road 2315 378 north of the fence will continue to provide access to the area.** | **2315 370** | **FS road that accesses a portion of the range fence in section 21, T22S., R16E. The concern is access to the fence via a road for maintenance and reconstruction.** |
| **By avoidance, protect the buried water line where these roads follow or cross the water line corridor during the closure or decommissioning implementation.** | **2312 444; 2312 466; 2312 160, and 2300 100** | **Damage to the water line during the road or decommissioning process.** |
| **Gate 300 road at intersection with 2017 and on rocky ridge with the 408 road and allow administrative access by FS & permittee as needed.** | **2017 300 and 2017 408.** | **Access to range improvements (fence) on 2017 300 road and fence and trick tank on 2017 408 road.** |

### Off Highway Vehicles

1. To increase communication and protect rider safety, notify the OHV specialist prior to any treatment operations in the vicinity of OHV trails to allow time for the installation of closure signs, public notification, or other actions to improve rider safety (both alternatives).

2. Use standard contract provisions for protection of improvements to repair or replace trails, signs, road closures, fences, barriers, or other facilities that are impacted by treatment operations (both alternatives).

3. To protect the trail prism, equipment wider than the OHV trail (50 inches in most cases) would not be used on the trail. Roads or old skid trails that have been obliterated and converted to trails would not be used for hauling, skidding, or other treatment operations (both alternatives).

4. To protect resources and improve esthetics, do not use earthen berms more than 30 inches high as a road closure method on any roads scheduled to be closed or re-closed in the project area. Improve the effectiveness of the berms by placing a log across the top. Larger berms serve to attract use by providing jump opportunities. Disguise roads by placing logs, boulders and forest debris randomly across the route (both alternatives).

5. To protect the integrity of the OHV trail system during the use season, Level 1 roads that have been reopened to provide unit access and all roads closed or obliterated under either Alternative 2 or 3 would be ripped, blocked, or otherwise treated to deter vehicle access. In addition, spur roads (including skid trails) within treatment units that cross OHV trails would be ripped, blocked, or otherwise treated to avoid confusion as to the continuing direction of the OHV trail. This work will be done within 30 days after finishing each entry into a unit (both alternatives).

6. Where OHV trails cross roads within treatment units, enough forest debris, or untreated material would be left at the crossing to discourage 4x4 access to the trails (both alternatives).

7. In treatment units that contain OHV trails that are not on roads, operations would leave enough trees, slash, blowdown, stumps, or untreated material to maintain the integrity of the trail alignment and protect the "forest" experience created by the trail (both alternatives).

8. To protect the integrity of the trail prism and prevent further 4x4 vehicle access, roads that have been closed and are naturally re-vegetating will not be opened up for use by vehicles (both alternatives).

9. Within the East Fort Rock OHV area, where OHV trails pass through units that contain slopes over 20 percent, do not create open corridors during unit layout and implementation that could become hill climbs (Unit F05 north of Trail 43) (both alternatives). Outside of East Fort Rock, where slopes exceed 20 percent avoid creating open corridors during unit layout and implementation that could become hill climbs. Fall trees, place slash, rocks, or other natural debris within and across any corridors to prevent or disrupt motorized travel.

10. Vegetation treatments within trailheads/staging area shall be limited to hazard tree reduction with a non-treatment buffer that will prevent new trails from radiating out from the trailhead/staging area and maintain the integrity of the boundary (Camp II Trailhead -units P19 and H26 in Alternative 2; and units C323 and C324 in Alternative 3).

11. Do not implement fuel treatments within the Road 25 staging area (unit F13 - both alternatives) or the Camp II Trailhead (unit F23 - both alternatives). Create a non-treat buffer (average of 100 feet) around these sites to maintain the integrity of the site boundary and prevent cross-country travel from these sites (both alternatives). Exclude the Camp II Learners Loop from both vegetation and fuel treatments (Units F23 and P19 in Alternative 2 and F23 and C324 in Alternative 3).

12. Directionally fall all trees away from OHV facilities (trails, trailheads, staging areas, signs, barriers, etc.). Do not deck trees or logs within 50 feet of the trails, fences, barriers, or other structures and 100 feet of trail heads or staging areas. For trees or logs located within 200 feet of trails, staging areas, or trailheads, require bull line pulling to the skidder.

13. Require equipment to cross trails at right angles. Minimize the number of crossings with no crossings closer than 100 feet apart. Mark approved crossing locations with contractor/purchaser.

14. Remove all slash from trails and shared use roads. For commercial harvest and fuel reduction operations, removal would occur within 48 hours of completion of operations. For non-commercial operations, removal would be within 24 hours after creation.

15. Do not pile slash materials within 30 feet of trails and 100 feet of trailheads and staging areas.

16. Block all skid trails and fire lines that intersect with designated trails and shared use roads. Use slash materials and other local, natural forest materials disturbed or displaced during operations such as: logs, rocks, brush, etc.

17. Retain higher tree and brush stocking levels within 30 feet of trails and 100 feet of trailheads and staging areas. Avoid cutting, crushing, burning, or mowing trees or shrubs within 50 feet of trails and 100 feet of staging areas and trailheads.

18. Use the measures described above to minimize damage to trails, trailheads, facilities, and staging areas to also protect the trail prism and discourage use off of designated routes.

**Heritage Resources**

1. Coordinate with district archeologist to avoid all known cultural resource sites and to locate treatment unit boundaries away from sites. If located within a treatment unit boundary, include the site within the boundaries of retention/leave blocks. Coordinate with wildlife. Include a buffer of at least 30 feet to provide additional protection.

2. Include appropriate protection language in all service and timber sale contracts to protect known and unknown sites. Include similar language/requirements in project work plans for force account activities.

3. Coordinate with district archeologist prior to initiation of unit layout and/or force account work to identify areas with high probability of unknown sites. Such areas may require additional survey work and/or on-the-ground coordination to identify and avoid known and unknown sites during layout.

4. Schedule burns to keep soil temperatures below 400 degrees F to protect buried sites from damage.

**Fire/Fuels**

1. Follow all state and federal air quality and smoke management laws, regulations, and requirements.

2. Limit burning and mowing activities to 2.5 percent of the WRHU acres per year.

3. Leave 10 percent of the unit acres untreated in Alternative 2 and 20 percent in Alternative 3.

4. **Special Uses:** When treating prescribe burn units adjacent to special use permit areas such as Pine Mountain Observatory, electronic sites, the BPA substation, BPA transmission line corridor, other utility corridors, or improvements, developments, cultural or historic sites, or other resources of value, station one or more engines and crews in or adjacent to such sites. Establish hose lays or other protection/preventive measures to assist in protecting sites during burning operatings.

**Sale Area Improvement Projects**
The following projects included in this proposal are proposed sale area improvement projects. They are proposed in accordance with direction contained in Forest Service Handbook 2409.19, were prioritized by the interdisciplinary team, and are listed in order of priority.

- Sale Area Improvement Projects (Reforestation)
    1) Slashing of small trees on planting areas;
    2) Site preparation for natural regeneration;
    3) Hand or grapple piling of slash;
    4) Planting of tree seedlings; and
    5) Tubing for animal damage control.

- Sale Area Improvement Projects (Non-reforestation)
    1) Subsoiling to reduce soil impacts to no more than 20 percent of each unit area;
    2) Subsoiling to restore pre-existing skid trails used this entry on slopes greater than 30 percent;

3) Monitoring for noxious weeds;
4) Planting of both tree seedlings and mountain mahogany plants;
5) Snag creation;
6) Trick tank gate for access to west Pine Mountain;
7) Construction of wildlife friendly fences along the Forest/BLM boundary;
8) Guzzler construction;
9) Fence construction around an existing water set to separate use by OHV's, campers, and cattle;
10) Removal of existing fences approved for removal in the Cinder Hill project;
11) Old growth boundary marking;
12) Non-commercial thinning; and
13) Hand or grapple piling and burning of slash.

- Subsoiling, items 1 and 2 on the sale area improvement projects (non-reforestation) list are mitigation items under this proposal.

# CHAPTER 3 - EXISTING CONDITION & ENVIRONMENTAL CONSEQUENCES

This section provides the scientific and analytical basis for alternative comparison. This section describes the beneficial or adverse impacts to the environment that would occur if the various alternatives were implemented. Probable effects are discussed in terms of environmental changes from the current condition and include qualitative as well as quantitative assessments of direct, indirect, and cumulative effects.

Effects (or impacts) are defined as follows:

**Direct effects:** Those that occur at the same time and in the same general location as the activity causing the effects.
**Indirect effects:** Those that occur at a different time or different location than the activity to which the effects are related.
**Cumulative effects:** – Those that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Unless otherwise noted, the boundary for the area for cumulative effects for all resources is generally the planning area boundary. Depending on the resource area, there may be multiple analysis area boundaries of differing sizes and include areas within and outside of the planning area boundaries.

The information contained in this section regarding the effects of the proposed actions under each alternative is summarized from the following specialist reports: Wildlife (including Threatened, Endangered, and Sensitive species), Range, Recreation, Silviculture, Fire and Fuels, Heritage Resources, Soils, Botany including noxious weeds, and Off-Highway Vehicle (OHV). Additional and more detailed information regarding the existing condition and supporting documentation can be found in those reports or the project file at the Bend-Fort Rock Ranger District office. All quantities, including but not limited to acreages, distances, and volumes, are approximate.

This chapter summarizes the physical, biological, social, and economic environments of the project area and the anticipated effects of implementing each alternative on that environment.

“Existing Condition” refers to the existing biological, physical and social conditions of an area that are subject to change directly, indirectly, or cumulatively as a result of a proposed human action. Information on the existing condition is found in each resource section under “Existing Condition.”

The following discussion of effects follows CEQ guidance for scope (40 CFR 1508.25(c)) by categorizing them as direct, indirect, and cumulative. The focus is on cause and consequences. Effects exist in a chain of consequences and thus may be labeled “indirect” (occurring later in time or farther in distance, 40 CFR 1508.8(b)), rather than cumulative. For this analysis, in general, direct and indirect effects have been discussed in the context that most readers are accustomed to: those consequences which are caused by the action and either occur at the same time and place, or are later in time or farther removed in distance but are still reasonably foreseeable (40 CFR 1508.8). Cumulative effects are discussed where there is an Effect to the environment which results from the incremental effect of the action when added to other past, present, or reasonably foreseeable future actions (40 CFR 1508.7).

There are basically two methodologies the individual resource subjects use in discussing cumulative actions and consequences. The first method would be to describe each individual past, present and reasonably foreseeable action – including mitigation (cataloging). The second would be to “lump” individual actions if the information regarding those actions would not be useful to illuminate or predict

the effects of the proposed action and its alternatives. A mere "cataloging" of effects may not provide the most useful discussion. In some cases, lumping past actions and describing them in terms of "where we are today" can be the most informative. No matter which method is used, it will be formulated to provide the most relevant, useful, helpful, necessary and informative format for the public and deciding official.

Measures to mitigate or reduce adverse effects caused by the implementation of any of the actions proposed are addressed in Chapter 2, Mitigation Measures. Effective mitigation avoids, minimizes, rectifies, reduces, or compensates for potential effects of actions.

The temporal and spatial scale of the analysis is variable depending upon the resource concern being evaluated, particularly for cumulative effects. The landscape within the Opine project area boundary is the focus of this EA, but adjacent lands are considered in this analysis process. Neither of the two action alternatives is related to any other actions with cumulatively significant impacts; neither is a component part of any larger action.

**Past, Present and Reasonably Foreseeable Future Actions**

The Opine project is one of several projects planned or ongoing within and adjacent to the project area. Table 3-1 includes those that are in the planning process and those that have been wholly or partially implemented, as well as other natural or human-caused events that have affected the landscape; effects of these projects are considered in the cumulative effects analysis disclosed in Chapter 3 of this EA.

***Current and On-going Actions:***

1) Grazing on BLM and private lands to the north and east of the planning area;
2) BLM Upper Deschutes Resource Management Plan (Programmatic);
3) East Fort Rock and Millican (BLM) OHV trail systems, planning area outside of the EFR system, and BLM lands to the east of Pine Mountain;
4) Utility line maintenance to Antelope and Pine Mountain electronic sites and Pine Mountain Observatory;
5) R/W maintenance along the BPA powerline corridor and adjacent to the BPA substation at Sand Springs (includes removal of shrub and tree vegetation; tower maintenance, etc.);
6) Bitterbrush study plots; and
7) Firewood cutting.

**Table 3-1. Past, Present, and Reasonably Foreseeable Future Actions and Events.**

| Project/Event Name | General Description of Activities or Event | Status |
|---|---|---|
| Pine Mountain Observatory Master Plan EA (2004) | Site plan for Improvements | Ongoing |
| Cinder Hill Range Allotment (2004) | Grazing Allotment | Ongoing |
| Cluster II Range Allotment EA (2005) | Grazing Allotment | Ongoing |
| Central Oregon large wildfires, including Dead Wilma (1977), Aspen Flat (1959), and Pine Mountain Fire (1914, 1968, and 1977) | Natural or human-caused wildfire events that burned through thousands of acres of timber with varying degrees of intensity and tree mortality | Past events |
| Class II OHV Trail (2007) | The proposed designated Class II OHV trail on Pine Mountain would use existing system roads and undesignated routes that currently exist and have been identified | Planning |

| Project/Event Name | General Description of Activities or Event | Status |
|---|---|---|
| Ground Hog Rock Pit | Rock Source used for applying to roads within the Opine Planning Area | Ongoing |
| Dispersed recreation | Camping, OHV riding, site seeing (vehicle), horseback ridding, deer/small game hunting, biking, hang and para-gliding and cross country hiking. | Ongoing |
| Sunriver HFRA (2007) | Fuels reduction within and adjacent to Wildland Urban Interface | Planning |
| South Bend HFRA (2007) | Fuels reduction within and adjacent to Wildland Urban Interface | Planning |
| Opine Vegetation Management EA (2006) | Commercial and Non-Commercial Thinning and Fuels Reduction. | Planning |
| East Fort Rock Administrative Closure (1993) | Area Closure unless designated open. | Implemented |
| West-wide Corridor Programmatic EIS | The Department of Energy analysis team is developing and analyzing alternatives for the PEIS. Proposed energy power corridor travels through eastern side of planning area and approx. 1,227 acres fall within the buffered corridor. | Planning |
| Opine Winter Range Seasonal Closure: Dec.1 to March 31 (2010) | Area Closure unless designated open. This will not take affect until after vegetation treatments are completed. Approximate date for seasonal closure to take affect is Dec.1 of 2010. | Planned |
| Fox Butte Cooperative Travel Management Area program (Green Dot system) | Open road and motorized trail densities are reduced during the deer-hunting season that reduces open road/motorized trail densities to approximately 2.92 miles per square mile. | Implemented |
| Deschutes National Forest Access and Travel Management (2010) | Deschutes National Forest is currently evaluating its travel management policies and direction provided by the Washington Office of the Forest Service. The proposed new travel management direction would identify a system of roads and trails for motorized travel and eliminate cross country motorized travel except on designated routes (see OHV) | Planning |
| Deschutes and Ochoco Invasive Plant EIS (2006) | Deschutes and Ochoco National Forests are currently preparing an EIS addressing invasive plants on both the Deschutes and Ochoco Forests with completion expected in early 2007 | Planning |

## Issue-Related Consequences

The analysis of effects on wildlife, and specifically for mule deer in MA-7, (deer habitat land allocation) was conducted using ***Winter Range Habitat Units*** (WRHUs) rather than the ***Implementation Units*** prescribed by the LRMP. WRHUs were proposed as the "Implementation Units" to assess the potential impacts of commercial and non-commercial thinning and fuel reduction activities on wildlife and wildlife habitat and specifically on mule deer. This recommendation was incorporated into a Memorandum of Understanding (MOU) between the Bend-Fort Rock Ranger District and the Oregon Department of Fish and Wildlife (ODFW) and was signed by Forest Supervisor Weldon on March 30, 2001.

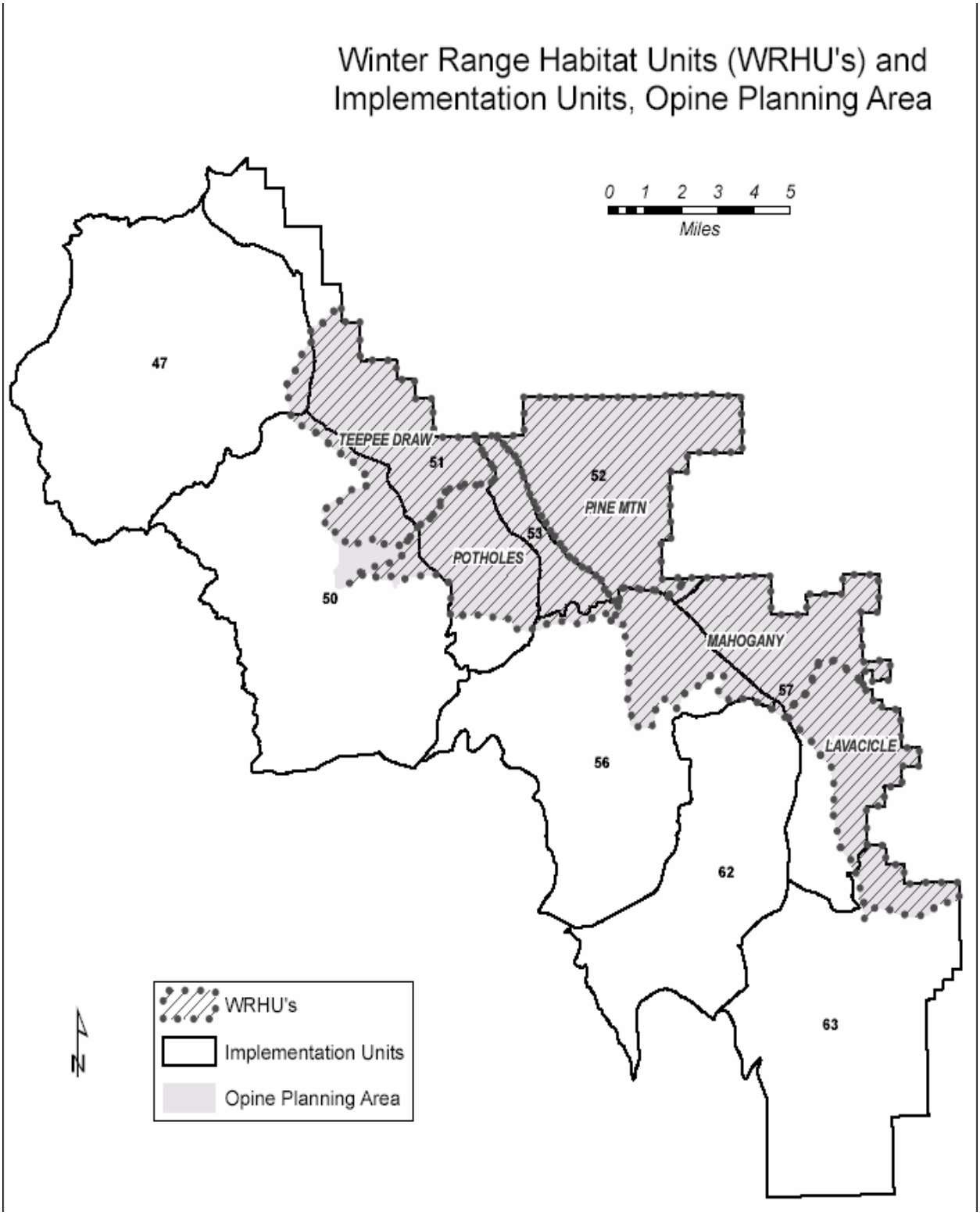
Implementation units are used to determine consistency with the LRMP. Figure 3-1 displays the relationship between the planning area, WRHUs, and implementation units. WRHUs are designated by a name – Pine Mountain, Tepee Draw, etc.; implementation units are designated by a number – 51, 52, etc.

***Implementation Units*:** To meet Forest Plan Consistency, Implementation Units effects are disclosed under ***Key Issue #1:*** Effects on Mule Deer Habitat (a) Vegetation Treatments in Deer Habitat, Measurement Standard - Percentage hiding and thermal cover after treatment; Alternative 2 and 3 (Hiding /Thermal Cover), Alternative 2 and 3 (Forest Plan Consistency); and under **Key Issue #1** (b) Effects of Open Road and

Motorized Trails on Habitat Effectiveness**,** Measurement Standards for: Miles of system roads closed and decommissioned**;** Open Road Densities by Implementation Units.

Figure 3-1 displays the spatial relationship between the planning area, Implementation Units (IUs), and WRHUs.

Figure 3-1 Winter Range Habitat Units (WRHUs) and Implementation Units (IUs) Associated with the Opine Planning Area.



***Key Issue #1:*** **Effects on Mule Deer Habitat (a) Vegetation Treatments in Deer Habitat; and (b) Effects of Open Road and Motorized Trails on Habitat Effectiveness.**

**(a) Vegetation Treatments in Deer Habitat**

Approximately 89 percent of the Opine planning area is in the MA-7, (deer habitat winter range), land allocation of the LRMP. These acres are also identified as biological winter range for deer. The planning area is currently below LRMP standards and guidelines for both thermal and hiding cover. Existing forest stands that provide hiding and thermal cover lack structural diversity and contain tree stocking levels above the historic range of variability. Such stands are increasingly subject to insect infestation and increased wildfire severity and are not ecologically sustainable. Approximately 1/3rd of the planning area is in open, xeric shrublands. Shrubs, particularly bitterbrush provides critical winter mule deer forage in addition to providing nesting and foraging habitat for shrub-associated wildlife species. The desired condition for bitterbrush habitats in the planning area is to have a ratio of 1/3rd in early seral, 1/3rd in mid seral, and 1/3rd in late seral (late and decadent) habitats. Current bitterbrush habitats are dominated by late seral (late and decadent) habitats totaling 65 percent of the bitterbrush acreage. Early and mid seral conditions are found on 26 and 10 percent of the bitterbrush acres respectively.

***Measurement Standards:***

- Percentage of hiding and thermal cover after treatment.
- Bitterbrush age/structure ratios

**Existing Condition of the Planning Area** – Nearly 90 percent of the planning is classified as big game winter range that is important to mule deer, elk, and antelope. The remainder of the area is summer range. There is no classified transition range. Mule deer are the predominant big game species across the planning area and are distributed across the area throughout the year. For the purposes of this analysis, it is assumed that the requirements of mule deer will meet those of the relatively few elk and pronghorn antelope that inhabit the planning area.

Approximately 26,549 acres of the approximately 54,623 acres in the planning area are considered forested. These forested acres contain all or most of the existing and potential hiding and thermal cover in the planning area.

The Opine planning area is located within the North Paulina Management Unit for mule deer. This is a subunit of the Paulina herd management unit, as designated by the Oregon Department of Fish and Wildlife. This unit includes approximately 700,000 acres across both public (including National Forest and BLM managed lands) and private lands. Approximately 400,000 acres of that area are identified as summer range. Herd management objectives for this entire management unit

(North Paulina) were established jointly with the Oregon Department of Fish and Wildlife (ODFW). When the LRMP was adopted in 1990, the management objective for the winter mule deer population for this management unit was established at 5,500 animals (S&G WL52 LRMP page 4-58). This objective has been periodically reviewed with the most recent review, December 2004, maintaining this population objective for this management unit.

Table 3-2 summarizes estimated wintering mule deer populations in the North Paulina management unit from 1990 to the present. The population index is a measure of how closely the population estimate comes to meeting the management objective of 5,500 animals for the North Paulina mule deer herd.

**Table 3-2 Winter Mule Deer Population Estimates for the North Paulina Management Unit, 1990 to 2006 (Source: Glen Ardt, Regional Habitat Biologist, ODFW).**

| Survey Year | Winter Population Estimate | Population Index (Percent of Management Objective) |
|---|---|---|
| 2006 | 2,900 | 53 |
| 2005 | 3,300 | 60 |
| 2004 | 3,300 | 60 |
| 2003 | 4,400 | 80 |
| 2002 | 4,400 | 80 |
| 2001 | 4,400 | 80 |
| 2000 | 5,000 | 90 |
| 1999 | 5,100 | 93 |
| 1998 | 5,400 | 98 |
| 1997 | 4,100 | 75 |
| 1996 | 4,000 | 73 |
| 1995 | 3,900 | 71 |
| 1994 | 3,300 | 60 |
| 1993 | 3,900 | 71 |
| 1992 | 4,700 | 85 |
| 1991 | 5,000 | 91 |
| 1990 | 4,600 | 83 |

Population trends for this management unit have been in decline since 1998 when the population peaked at an estimated 5,400 animals or 98 percent of the management objective. Past declines have been attributed to severe, prolonged winter weather; however the current trend does not have this contributing agent. ODFW is concerned about impacts to deer in the North Paulina area including: past wildfires such as the Skeleton, Evans, and 18 fires, private land development, mortality of migrating deer in the Highway 20 and 97 corridors, disturbance by recreationists, livestock grazing, poaching, and habitat alterations by fuels management activities, particularly in the wildland-urban interface. This trend, as exhibited by the estimated population numbers, suggests that current situation appears to be deteriorating for mule deer and additional negative effects, including excessive road/trail densities, will potentially cumulatively add to the impacts on the population.

**Existing Condition Hiding Cover** - Hiding cover provides security for deer during hunting season, from poachers, and from some predators. Hiding cover was defined using the definition developed by Thomas (1979), which requires vegetation capable of hiding 90 percent of a standing adult deer or elk from the view of a human at 200 feet or less.

Table 3-3 summarizes existing hiding cover across the planning area. Acceptable cover stands for the purposes of this table and the subsequent analysis are defined as stands with 75 percent or more good cover. Marginal cover acres were determined by using 50 percent of the gross cover acres with a maximum of 50 percent of the cover acres being in non-cover types. Non-cover is defined as vegetation or other features that would not hide at least 90 percent of a deer at 200 feet distance.

**Table 3-3 Acres and Distribution of Hiding Cover, Opine Planning Area**

| Winter Range Habitat Unit | Acres – Total / Forested | LRMP Land Allocation | Hiding Cover Quality | | | | Non-Cover Acres | Cover Percentage | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Acceptable (Acres) | | Marginal (Acres) | | | | |
| | | | Planning Area | Forested Area | Planning Area | Forested Area | | Planning Area | Forested Area |
| NA | 884 / 782 | General Forest | 285 | 283 | 55 | 54 | 488 | 38 | 43 |
| Lavacicle | 7,494 / 1,465 | Winter Range | 364 | 306 | 312 | 237 | 6,460 | 9 | 37 |
| | | Old Growth | 0 | 0 | 0 | 0 | < 1 | | |
| | | Special | 0 | 0 | 0 | 0 | 44 | | |
| | | *Totals* | *364* | *306* | *312* | *237* | *6,505* | *9* | *37* |
| Mahogany | 12,147 / 5,912 | Winter Range | 705 | 660 | 1,147 | 1,049 | 8,796 | 16 | 30 |
| | | General Forest | < 1 | < 1 | 1 | 1 | 4 | | |
| | | Old Growth | 68 | 65 | 42 | 38 | 194 | 32 | 43 |
| | | Other Ownership | 0 | 0 | 0 | 0 | 165 | | |
| | | *Totals* | *774* | *726* | *1,190* | *1,088* | *9,159* | *16* | *31* |
| Pine Mountain | 13,443 / 5,077 | Winter Range | 44 | 41 | 82 | 65 | 8,280 | 1 | 9 |
| | | Old Growth | 345 | 344 | 115 | 115 | 601 | 39 | 41 |
| | | Scenic Views | 755 | 741 | 229 | 221 | 2,405 | 27 | 34 |
| | | *Totals* | *1,144* | *1,126* | *426* | *401* | *11,286* | *12* | *30* |
| Potholes | 9,733 / 5,592 | Winter Range | 215 | 204 | 706 | 642 | 8,093 | 10 | 15 |
| | | General Forest | 0 | 0 | 2 | 2 | 8 | | |
| | | *Totals* | *215* | *204* | *708* | *644* | *8,101* | *9* | *15* |
| Tepee Draw | 10,925 / 7,721 | Winter Range | 354 | 343 | 221 | 205 | 10,096 | 5 | 7 |
| | | General Forest | 11 | 11 | 4 | 4 | 15 | | |
| | | *Totals* | *365* | *354* | *225* | *209* | *10,111* | *5* | *7* |
| **Totals** | | | **1,792** | **1,749** | **2,916** | **2,633** | **38,701** | **11** | **21** |

Using Thomas' definition, hiding cover varies across the planning area. The average across the entire planning area, including forest and shrubland acres, is approximately 11 percent. When only considering forested acres that do or have the potential to provide hiding cover, the percentage increases to approximately 21 percent. Summer range within the planning area is only located in the MA-8, MA-9, and MA-15 (general forest, scenic views, and old growth) land allocations. There is no corresponding S&G for hiding cover in the MA-7 (deer habitat winter range) allocation. The LRMP objective in the MA-7 allocation is to optimize habitat conditions with 40 percent of the allocation acres in a combination of hiding and thermal cover. Hiding cover is expected to constitute 25 percent of the cover acres with thermal cover the remaining 75 percent.

Table 3-4 summarizes the current conditions of the areas that contain significant amounts of deer summer range.

**Table 3-4 Deer Summer Range Areas in Opine Planning Area**

| Sub-Area (Forested Acres) | Acres of Current Cover (Percent of Forested Acres) |
|---|---|
| Pine Mountain (4,042 ac) | 1,445 ac. (36%) |
| General Forest (782 ac) | 337 ac (43%) |
| Pumice Springs OGMA (338 ac) | 113 ac (33%) |
| Totals (5,169 ac.) | 1,892 ac (37%) |

In most ponderosa pine stands in the planning area, hiding cover is generally of low quality. This is in part due to past timber harvest that cultured even-aged "black bark" ponderosa pine stands decreasing the quantity and distribution of hiding cover. Black bark stands generally lack understory regeneration and only provide the limbless boles of trees for cover. Better quality hiding cover is found in multi-story lodgepole pine stands (stands that contain regeneration). The lack of hiding cover is further exacerbated by extensive areas of xeric shrublands that do not provide hiding cover under the current definition. Areas of tall shrubs do provide "camouflage" cover, particularly in rolling topography. Roads and motorized trails also negatively affect deer hiding cover.

**Existing Condition Thermal Cover –** Thermal cover is defined as cover used by big game to moderate cold weather conditions and to assist in maintaining a constant body temperature. Tree canopy cover conditions that provide optimal thermal cover are considered to be: "A crown cover greater than 40 percent with trees 30 feet high is recommended for thermal cover." (LRMP, page 4-113)

Few if any of the forest acres in the planning area are capable of sustaining canopy cover levels that would meet the above thermal cover definition without running a high risk of damage or loss due to bark beetle attack and wildfire events.

Table 3-5 displays current thermal cover conditions within the planning area by WRHU and the general forest land allocation (MA-8). Optimal cover meets the LRMP definition for thermal cover; canopy closures are 40 percent or greater. Acceptable and marginal cover, canopy closures of 30 to 39 percent canopy closure and 20 to 29 percent canopy closure respectively, do not meet the LRMP definition of thermal cover. The cover acres and percentages only include forested acres as, by definition, shrublands do not provide thermal cover.

**Table 3-5 Current Thermal Cover Levels, Opine Planning Area**

| Winter Range Habitat Unit or LRMP allocation (forested acres) | Thermal Cover Quality Categories[31] (acreages) | | | | Sub-Area Totals: acres[32] /percentage of forested acreage |
|---|---|---|---|---|---|
| | Optimal | Acceptable | Marginal | Non-thermal | |
| General Forest (782 ac.) | 5 | 243 | 485 | 239 | 248 / 32% |
| Lavacicle (1465 ac.) | 0 | 297 | 1131 | 6061 | 297 / 20% |
| Mahogany (5912 ac.) | 35 | 430 | 2400 | 9248 | 465 / 8% |
| Pine Mt.- winter range only (1123 ac.) | (0) | (113) | (244) | (8129) | (113) / 10% |

[31] *Category definitions—optimal (LRMP definition) = 40+% canopy cover, acceptable = 31-39% canopy cover, marginal = 21-30% canopy cover, and non-cover =0-20% canopy cover (including non-forested habitat types).*

[32] *Acres of thermal cover only include the optimal and acceptable categories with the percentages based upon the forested areas (i.e. potential thermal cover habitats) of each sub-area*

| Winter Range Habitat Unit or LRMP allocation (forested acres) | Thermal Cover Quality Categories[31] (acreages) | | | | Sub-Area Totals: acres[32] /percentage of forested acreage |
|---|---|---|---|---|---|
| | Optimal | Acceptable | Marginal | Non-thermal | |
| Pine Mountain- gross area (5077 ac.) | 421 | 523 | 1746 | 10754 | 944 / 19% |
| Potholes (5580 ac.) | 5 | 105 | 1151 | 8428 | 110 / 2% |
| TePee Draw (7734 ac.) | 19 | 334 | 1318 | 9249 | 353 /5 % |
| Totals: 26550 forested project acres 25768 acres WRHUs 21814acres winter range | 485 | 1932 | 8231 | 43979 | 2,417 / 9% forested project acres 2,169 ac. / 8% WRHUs 1,338 ac./ 6% winter range |

The analysis shows that approximately nine (9) percent of the forested acres within the planning area rates as thermal cover. The general forest land allocation (MA-8) has the highest percentage, 32 percent, but there is no thermal cover requirement for that allocation. It is not utilized by wintering mule deer because it is also outside of biological winter range.

The acreage within WRHUs is predominately the deer winter range allocation (MA-7). Thermal cover averages approximately eight (8) percent, but is highly variable between WRHUs, ranging from a low of two (2) percent in the Tepee Draw WRHU (dominated by black-bark ponderosa pine stands) to a high of 20 percent in the Lavacicle WRHU (multi-storied lodgepole pine).

When only winter range acres (MA-7) are considered, the percentage of thermal cover declines to approximately six (6) percent of the forested acres across the project.

**Existing Condition Shrub Habitat -** Shrubs, primarily bitterbrush, ***Purshia tridentata*** (PUTR), provide critical mule deer winter forage. With approximately 89 percent of the planning area in designated winter range, the quality, quantity, and distribution of bitterbrush is an important consideration. They also provide nesting and foraging habitat for shrub-associated species such as the yellow pine chipmunk and golden-mantle ground squirrel and neotropical migrant birds such as Brewer's sparrow, sagebrush sparrow, and green-tailed towhee. Many of these species, particularly the seed-caching rodents like the the yellow pine chipmunk, serve an important ecological role in the regeneration of shrub species.

The planning area contains six (6) ponderosa pine plant associations, nine (9) lodgepole pine associations, and six (6) xeric shrub associations. Three plant associations: ponderosa pine / bitterbrush-sagebrush (***Artemisia spp***.) / fescue (22 percent); big sagebrush-bitterbrush / bunchgrass (22 percent); and ponderosa pine / bitterbrush / fescue (19 percent) dominate over 60 percent of the planning area acreage. In total, approximately 33 percent of the area is in open, xeric shrublands and 67 percent is in forested habitat types.

Table 3-6 summarizes the current conditions of shrub habitats within the planning area.

**Table 3-6 Shrub habitats in the Opine Planning Area**

| Habitat Type | Description | Acreage[33] | Percent of Planning Area |
|---|---|---|---|
| 1 | Open, xeric shrubland, approx. 50:50 bitterbrush and big sagebrush; bitterbrush generally vigorous, 1'-4' tall | 4,897 | 8% |
| 2 | Open, xeric shrubland, approx. 30:70 bitterbrush and big sagebrush; bitterbrush generally decadent, 1'-4' tall | 5,482 | 9% |
| 3 | Ponderosa pine with bitterbrush understory, sparse to 50% canopy cover; shrubs generally vigorous, but heavily browsed | 13,860 | 24% |
| 4 | Lodgepole pine with mixed bitterbrush / sagebrush understory | 3,210 | 6% |
| 5 | Ponderosa pine with sagebrush and/or manzanita understory; <10% bitterbrush, heavily browsed | 11,727 | 20% |
| 6 | Open, xeric shrubland, dominated by sagebrush; <10% bitterbrush (generally none present) | 7,889 | 14% |
| 7 | Ponderosa pine with no shrub understory (some areas have been treated for fuels, most appear naturally shrub free) | 4,327 | 7% |
| 8 | Highly disturbed areas dominated by rabbitbrush; few other shrubs | 63 | <1% |
| 9 | Ponderosa pine / lodgepole pine with mixed bitterbrush and sagebrush understory | 405 | <1% |
| 10 | Ponderosa pine with bitterbrush understory sparse-50% CC, shrubs generally decadent | 3,574 | 6% |
| 11 | Ponderosa pine / lodgepole pine with mixed shrub understory, but no bitterbrush | 20 | <1% |
| 12 | Pumice with sparse vegetation | 2,390 | 4% |
| 22 | Rock outcrop | 23 | <1% |
| Totals | | 57,867 | 100% |

Shrub habitats were evaluated [deer forage, per LRMP M7-14] on the basis of winter range habitat units (WRHU) and ecological types (eco-type), per guidance and recommendations from the Deschutes National Forest ***"Integrated Natural Fuels Management Strategy"*** (INFMS) (pages 1-8 and 1-9) and the Devil's Garden Hole-in-the-Ground Winter Range Habitat Unit Analysis Process paper. WRHUs are areas in the biological winter range of mule deer ranging from 15,000 to 20,000 acres where habitat conditions and the potential effects of management activities are evaluated. Eco-types represent groupings of soil and potential vegetation, which are areas that have similar site potentials and are expected to have similar responses to treatments. Eco-types reflect similarities in:

- site carrying capacity;
- shrub recovery period;
- the expected successional pathways following various disturbances; and
- the potential for increases of undesirable plant species such as cheatgrass and rabbitbrush.

The INFMS identified the desired condition of the shrub habitats, including bitterbrush, as a ratio of 1/3rd early seral, 1/3rd mid seral and 1/3rd late seral habitat in each of the major eco-types within each WRHU.

There is a significant proportion of the existing bitterbrush in the planning area in the late and decadent age classes (65 percent). The desired long-term condition would be to have a total of approximately 33 percent in these two age class categories with equal amounts in each of the early and mid categories. Older shrubs, including bitterbrush, have value to many species; however, they are also at greater risk to loss from catastrophic fire, particularly if in large contiguous blocks.

[33] The total acreage represented by these habitats exceeds the acreage in the planning because GIS mapping polygons located along the project boundary extended beyond the project boundary. The acreage figures include the full polygon, not just the portion within the planning area boundary.

From 1990 to 1999, a total of 4,992 acres were either mowed or underburned in the planning area. This includes approximately 1,803 acres of mowing and approximately 3,189 acres of underburning. No treatments have been implemented in the planning area since 2000.

Wildfire has also contributed to the current age class/structure condition in the planning area. The largest fires to impact portions of the planning area include the 8,022 acre Pine Mountain Fire of 1914 and the 15,577 acre Aspen Flat Fire in 1959. Because of the time since these fires occurred, shrub conditions in those areas were not independently assessed.

Table 3-7 summarizes the existing condition, specifically age class and structure, for bitterbrush. Conditions resulting from past wildfires such as the Aspen Flats and Pine Mountain fires are reflected in the table. Effects of timber sale and natural fuel reduction activities which occurred prior to 1990 are also assumed to be represented in the existing conditions displayed in the table. Areas which had management activities implemented since 1990 were considered to have moved age class/structure into the early seral category.

**Table 3-7 Bitterbrush Age Class/Structure Distribution, Opine Planning Area**

| Winter Range Habitat Unit or LRMP allocation | Age Class / Structure (acres / % of Shrub Acreage) | | | | No Bitterbrush (acres/% of gross acreage)[34] | Total Ac /% of Project Area |
|---|---|---|---|---|---|---|
| | Early[35] | Mid | Late | Decadent | | |
| General Forest | 464 / 48% | 150 / 16% | 130 / 13% | 223 / 23% | 5 / <1% | 972 / 2% |
| Lavacicle | 1,581 / 24% | 0 / 0% | 4,343 / 65% | 772 / 12% | 791 / 11% | 7,487 / 14% |
| Mahogany | 4570 / 53% | 94 / 1% | 1,805 / 21% | 2,085 / 24% | 3,558 / 29% | 12,112 / 22% |
| Potholes | 2,608 / 27% | 466 / 5% | 1,809 / 19% | 4,780 / 49% | 27 / 0% | 9,690 / 18% |
| Pine Mountain | 2,150 / 17% | 3,221 / 25% | 3,908 / 30% | 3,547 / 28% | 617 / 5% | 13,443 / 25% |
| TePee Draw | 1,361 / 12% | 940 / 9% | 3,392 / 31% | 5,226 / 48% | 0 / 0% | 10,919 / 20% |
| Totals: | 12,734 / 26% | 4,871 / 10% | 15,387 / 31% | 16,633 / 34% | 4,998 / 9% | 54,623 / 100% |

**Measurement Standard – Hiding Cover**

The LRMP standard for hiding cover is variable. On deer summer range (i.e. all management area allocations except Deer Habitat) it is a minimum of 30 percent within an Implementation Unit. There is an exception for black-bark ponderosa pine, which is 10 percent within treated stands. For Deer Habitat (i.e. Management Area 7) the minimum hiding cover objective is 10 percent of the Forested acres.

**Hiding Cover –** Hiding cover is variable across the planning area ranging from seven (7) to 37 percent within the WRHUs, but only averaging 21 percent of the forested acres across all management allocations and WRHUs in the planning area. This is below the LRMP standard and guideline of 30 percent (WL-54, LRMP page 4-58) for summer range areas. Only the General Forest land allocation (MA-8) and the Pine Mountain area (OGMAs and Scenic Views land allocations) contain significant amounts of deer summer range. Minor amounts are also present in the Pumice Springs OGMA. Cover quality in ponderosa pine stands is generally low. It is in better condition in lodgepole pine stands that

[34] This column includes acres with plant associations that do not have the potential for bitterbrush.

[35] The early category includes acreages that currently has no bitterbrush present but the plant association for those acres has potential for bitterbrush. The age class/structure percentage is based on net acres, i.e., gross acres minus the acres with no bitterbrush present.

contain regeneration. Xeric shrublands do not provide hiding cover as currently defined. Areas of tall shrubs do provide camouflage cover, especially in areas of rolling topography.

Tables 3-8 and 3-9 display the effects of proposed vegetation and fuel reduction treatments on hiding cover under each of the action alternatives. Table 3-8, displays the effects across the entire planning area.

**Table 3-8 Effects of Fuel Reduction and Vegetation Treatments on Planning Area Wide Deer Hiding Cover Acres**

| Hiding Cover Quality | Fuel Treatment Prescription | Veg Treatment Prescription | Alternative 2 | | | Alternative 3 | | |
|---|---|---|---|---|---|---|---|---|
| | | | Hiding Cover (Gross Acres) [36] | Net Reduction w / 10% Retention (Net Acres) | Acres Converted to Other Type (Gross / Net Acres) | Hiding Cover (Gross Acres) [36] | Net Reduction w / 20% Retention (Net Acres) | Acres Converted to Other Type (Gross / Net Acres) |
| Good | -- | MTT | 508 | 457 | -- | 442 | 354 | -- |
| Good | -- | STT | 125 | 113 | -- | 213 | 97 | -- |
| Good | Burn | -- | 21 | -- | 21 / 11 marginal | 10 | -- | 10 / 6 / marginal |
| Good | Burn | MTT | -- | -- | -- | 7 | 6 | -- |
| Good | Burn | STT | -- | -- | -- | 13 | 10 | -- |
| Good | Pre-Treat, Burn | -- | 255 | 229 | -- | 298 | 239 | -- |
| Good | Pre-Treat, Burn | MTT | 902 | 812 | -- | 347 | 278 | -- |
| Good | Pre-Treat, Burn | STT | 637 | 573 | -- | 1,142 | 914 | -- |
| Good | Pre-Treat, Mow | -- | 8 | 7 | -- | 4 | 3 | -- |
| Good | Pre-Treat, Mow | MTT | 17 | 15 | -- | 9 | 7 | -- |
| Good | Pre-Treat, Mow | STT | 6 | 2 | -- | 18 | 14 | -- |
| | | | | | | | | |
| Marginal | -- | MTT | 407 | 184 | -- | 505 | 195 | -- |
| Marginal | -- | STT | 156 | 70 | -- | 196 | 79 | -- |
| Marginal | Burn | -- | 388 | 194 | -- | 116 | 47 | -- |
| Marginal | Burn | MTT | 125 | 57 | -- | 109 | 44 | -- |
| Marginal | Burn | STT | 81 | 37 | -- | 143 | 58 | -- |
| Marginal | Pre-Treat, Burn | -- | 612 | 275 | -- | 480 | 192 | -- |
| Marginal | Pre-Treat, Burn | MTT | 357 | 161 | -- | 698 | 160 | -- |
| Marginal | Pre-Treat, Burn | STT | 392 | 176 | -- | 416 | 187 | -- |
| Marginal | Mow | -- | -- | -- | -- | 28 | 0 | -- |
| Marginal | Pre-Treat, Mow | -- | 43 | 20 | -- | 28 | 12 | -- |
| Marginal | Pre-Treat, Mow | MTT | 15 | 7 | -- | 18 | 8 | -- |
| Marginal | Pre-Treat, Mow | STT | 5 | 3 | -- | 16 | 7 | -- |
| | | | | | | | | |

[36] Hiding cover acres under both action alternatives reflect the number of cover acres within treatment units only. Total estimated existing number of acres of good or marginal hiding cover is estimated at approximately 5,627 acres. Alternative 2 does not have activities prescribed in approximately 570 acres of existing cover; Alternative 3 does not treat approximately 724 acres of existing cover.

| Hiding Cover Quality | Fuel Treatment Prescription | Veg Treatment Prescription | Alternative 2 | | | Alternative 3 | | |
|---|---|---|---|---|---|---|---|---|
| | | | Hiding Cover (Gross Acres) [36] | Net Reduction w / 10% Retention (Net Acres) | Acres Converted to Other Type (Gross / Net Acres) | Hiding Cover (Gross Acres) [36] | Net Reduction w / 20% Retention (Net Acres) | Acres Converted to Other Type (Gross / Net Acres) |
| Non-Cover | All Treatments | All Treatments | (16,396) | 0 | -- | (15,155) | 0 | -- |
| | | | | | | | | |
| Totals | | | 5,060 | 3,395 | 11 marginal | 4,956 | 2,911 | 6 marginal |

Table 3-9, displays those effects by WRHU and the General Forest sub-unit. The LRMP identifies both mule deer and Rocky Mountain elk as MIS species; the analysis assumes that the requirements for mule will meet the requirements for the few elk in the planning area.

**Table 3-9 Effects of Vegetation and Fuel Treatments on Hiding Cover by Alternative, Land Allocation, and WRHU**

| Sub-Area | Forested Acres | Existing Hiding Cover (Ac)[37] | Treatment Reduction (Ac.) | | Post-Treatment Hiding Cover (Ac.) | | Pct Residual Hiding (Current Pct Cover)[38] | |
|---|---|---|---|---|---|---|---|---|
| | | | Alt 2 | Alt 3 | Alt 2 | Alt 3 | Alt 2 | Alt 3 |
| General Forest (Summer Range) | 782 | 337 | -335 | -284 | 2 | 53 | <1 (43) | 6.7 (43) |
| Lavacicle WRHU | 1,465 | 543 | -490 | -365 | 53 | 178 | 3.6 (37) | 12.2 (37) |
| Mahogany WRHU | 5,912 | 1,812 | -305 | -286 | 1,507 | 1,526 | 25 (31) | 25.8 31) |
| Pine Mtn WRHU[39] | 5,077 | 1,642 | -1,239 | -1,232 | 403 | 410 | 7.7 (29) | 8.0 (29) |
| Potholes WRHU | 5,592 | 848 | -475 | -364 | 373 | 484 | 6.7 (15) | 8.6 (15) |
| Tepee Draw WRHU | 7,721 | 563 | -511 | -368 | 52 | 195 | <1 (7) | 2.5 (7) |
| Totals | 26,549 | 5,745 | -3,355 | -2,899 | 2,390 | 2,846 | 8.9 (21) | 10.7 (21) |

**Note: LRMP hiding cover for Gen Forest is 30% or 10% of treated stands if black bark. MA7 is 10% with no black bark exception**].

### Alternative 1 (Hiding Cover):

Under Alternative 1, approximately 36 percent of the Pine Mountain summer range would remain as hiding cover; and 43 percent of the General Forest allocation would remain as hiding cover. The Pumice Springs OGMA area and associated summer range habitat within the *Implementation Unit*

[37] Existing hiding cover acres represent forested acres only. The difference in total hiding cover acres in this table and Table 3-10 is due primarily to rounding and GIS analyses conducted at different times resulting in slightly different results.

[38] Residual Hiding Cover percentage is based upon forested or potential habitat acres. Some minor acreages of General Forest are included in the figures for the other Sub-Areas, so the total acreage, 337 ac. of hiding cover is less than the actual acreage for this sub-area.

[39] Pine Mountain includes both winter and summer range.

would provide approximately 32 percent of the area in hiding cover. Increases, should they occur, would be more likely to be measurable after 10 years or more.

The effects of Alternative 1 on hiding cover would be similar to those described for thermal cover. The quantity, quality, and distribution of existing cover would either remain at or near current levels or could potentially see some degree of increase due to increasing stand densities in the short-term, 10 years. Increases in hiding cover would be expected to be the greatest in areas along forest edges, fringe areas, or in areas with significant levels of existing tree encroachment. Some increases in cover could also be expected in areas where shrub species such as manzanita and ceanothus, which reach heights of 5 to 6 feet, but are currently relatively young and short in height. Long-term, more than 10 years, hiding cover quality and distribution would be expected to decrease, particularly in ponderosa pine stands where crowns "lift" due to reduced light levels and increasing amounts of self-pruning occur. This would result in increased sight distances into those stands. These reductions may, in part, be offset by increased shrub growth and by increased tree mortality associated with increased inter-tree competition and mortality associated with bark beetle activity or disease agents. Standing dead and fallen trees would provide visual screening thereby maintaining or improving hiding cover.

In lodgepole pine stands, hiding cover quantity and quality would be expected to increase during the short-term. Increasing levels of overstory mortality associated with bark beetle activity and age would result in increased amounts of regeneration resulting in increased stand densities and decreased sight distances. In some ponderosa pine types that contain lodgepole pine, regeneration of lodgepole would also provide additional visual screening.

Although increasing stand densities provide increased screening and hiding cover, increased densities also increase the risk of bark beetle attack and as well as the increased risk of loss due to an uncharacteristic wildfire event. Bark beetle attack would leave all trees standing, and depending on diameter, would likely retain most for at least the first decade. Most would likely fall within the first two decades after death and only scattered larger trees would likely continue to stand beyond that point. Fallen trees would continue to provide at least some cover by breaking up sight distances. Experience suggests that natural regeneration, particularly of ponderosa pine, would be limited and slow on many sites due to the extensive areas of downed wood, relatively low site quality, lack of water, and the reduced availability of a seed source. This would delay the development of a tree understory that would provide replacement cover. Continuous coverage by downed wood could potentially limit movement; discontinuous distribution of downed material would provide both cover and permit movement.

Lodgepole pine stands subject to bark beetle attack are more likely to result in rapid and dense regeneration. Cover would be more quickly restored, probably within 10 years.

It is impossible to determine when an insect attack or wildfire would impact a specific acre. As stand density and time between fires increase, the probability of such events occurring also increases. Long-term, more than a decade and short of a wildfire, the loss of hiding cover due to bark beetle attack would be expected to be much slower than the loss of thermal cover, which is dependant upon canopy closure. Tree mortality eliminates all or portions of the canopy thereby decreasing or eliminating the thermal cover. In contrast, hiding cover is provided by anything that covers or hides 90 percent or more of an adult deer or elk from a human at a distance of 200 feet. Although the loss of foliage does result in some loss of cover, the standing stems continue to provide cover until they fall. In small to medium sized trees, this cover could be retained up to one or two decades.

A wildfire could consume stems or cause stems to fall quickly thereby more quickly reducing hiding cover. Intense wildfires are more likely to consume more and larger stems resulting in much quicker reductions in hiding cover.

High intensity burns, especially in dense, overstocked forest stands, would also be expected to result in the loss of existing large diameter, mature and old growth ponderosa pine, trees that are resistant to frequent, low intensity fire. Most existing old growth stands currently contain continuous vertical fuels. Losses would be attributable both to the intensity of the fire as well as the increased probability of such fires climbing into the crowns of trees due to the presence of both high fuel loadings resulting in increased flame lengths and large quantities of ladder fuels.

Given current and likely future fuel loadings, an uncharacteristic wildfire would likely result in the complete destruction of existing hiding cover as evidenced by the 1996 Skeleton Fire and the 1959 Aspen Flats Fire. Recovery of cover to existing levels would likely take several decades; potentially a century or more if fire conditions are extreme. This would likely be true for both ponderosa and lodgepole pine stands.

**Action Alternatives**

The LRMP has different standards and guidelines for hiding cover for winter and summer ranges with summer ranges having a higher required percentage, 30 percent versus the 10 percent in required in winter range (LRMP page 4-58). Outside of the General Forest land allocation (MA-8), only the Pine Mountain WRHU contains any significant acreage of summer range although much of it is classified as biological winter range. Additional summer range acres are also found in the Pumice Springs OGMA. All of these acres are located within the MA-9 and MA-15 land allocations (scenic views and OGMAs). The MA-8 allocation (general forest) is dominated by black bark pine stands, which according to the LRMP, have a requirement of 10 percent of the acres in an untreated state (WL-54, LRMP page 4-58) within treatment units. Again, all numbers are approximate and small differences between numbers, particularly acreages, may occur due to a variety of reasons described in Chapter 1, including rounding of numbers; use of different data sets between analyses; differences in the parameters of the data request; and mapping differences.

**Alternative 2 (Hiding Cover):** Based on existing 26,549 forested acres, Alternative 2 would reduce hiding cover from 5,745 acres to 2,390 acres (Table 3-8). This would drop hiding cover from the current 11 percent of the planning area acres to 4.1 percent. Considering only the forested acres that are capable of providing cover, the level of cover drops from the current 21 percent to 8.4 percent. This is below the LRMP standard and guideline of 10 percent of the acres in winter range being hiding cover (LRMP page 4-113). It also is below the cover percentage for summer range, which is 30 percent within *Implementation Units*. Within treatment units in black bark pine stand located in summer range areas, the standard for hiding cover is 10 percent retained in an untreated condition. Treatment units in these types of stands would meet this cover standard because 10 percent of the treatment units would be retained as untreated patches within the treatment unit boundaries on Pine Mountain

**Alternative 3 (Hiding Cover)**: Alternative 3 reduces current cover levels by approximately 2,899 acres or 50 percent, to 2,846 acres. After treatment, 10.7 percent of the suitable or potential habitat acres (i.e., forested for entire project area) would contain hiding cover. In contrast to Alternative 2, Alternative 3 retains 20 percent of each treatment unit in an untreated state. This would exceed the LRMP standard within treated black-bark stands [i.e. 10 pecent minimum], which are present only in the **General Forest** management areas.

Alternative 3 does not comply with S&G WL-54 for summer range in IU #52 and #57. Proposed treatments reduce hiding cover levels below 30 percent in the MA-9 (**Scenic Views**) and MA-15 (**Old Growth**) allocations in IU #52 on Pine Mountain and in the MA-15 allocation in IU #57 in the Pumice Springs area. A non-significant plan amendment is proposed to waive the hiding cover requirement for these two implementation unit areas to permit proposed treatments to be implemented.

**Alternative 2 and 3 (Hiding Cover): (this section address effects common to the action alternatives)**
Under both Alternatives 2 and 3, there would be some short-term loss of hiding cover associated with both vegetation and fuel reduction treatments. Thinning would raise the base of the live crown. Pre-treatment, the removal of all or most of the trees four (4) inches dbh and smaller would remove both crown and stems and increase sight distances into stands. Non-commercial thinning of trees up to eight (8) inches dbh would also increase site distances into stands by removing primarily stems, but also crown mass. Both alternatives would reduce cover levels below LRMP standards and guidelines (WL-54, LRMP page 4-54) within treated areas.

In the areas that contain significant amounts of deer summer range, General Forest (MA-8), Pine Mountain (OGMA and scenic views land allocation only), and the Pumice Springs OGMA, both alternatives would result in large reductions in existing cover levels. The effects of proposed treatments are displayed in Table 3-10.

**Table 3-10 Effects of Fuel Reduction and Vegetation Treatments in Deer Summer Range Areas**

| Sub-Area (Forested Acres) | Acres of Current Cover (Percent of Forested Acres) | Fuel Treatment Effects | | Vegetation Treatment Effects | | Post-Treatment Cover | |
|---|---|---|---|---|---|---|---|
| | | Alt 2 | Alt 3 | Alt 2 | Alt 3 | Alt 2 | Alt 3 |
| Pine Mountain (4,042 ac) | 1,445 ac. (36%) | -240 ac | -130 ac | -1,030 ac | -1,049 ac | 175 ac (4%) | 266 ac. (7%) |
| General Forest (782 ac) | 337 ac (43%) | w/ veg | w/ veg | -335 ac | -284 ac | 2 ac (<1%) | 53 ac (7%) |
| Pumice Springs OGMA (338 ac) | 113 ac (33%) | w/ veg | w/ veg | -40 ac | -90 ac | 73 ac (21.6%) | 23 ac (6.8%) |
| Totals (5,169 ac.) | 1,892 ac (37%) | | | | | 247 ac (4.8%) | 342 ac (6.6%) |

Overall, current cover levels within the three summer range areas would decline from the current 1,892 acres (37 percent of the forested acres) to approximately 247 acres (4.8 percent of the forested acres) under Alternative 2 and to 341 acres (6.6 percent of the forested acres) under Alternative 3. Under Alternative 2, the number of acres of cover in the Pine Mountain sub-area would decline from the current 1,445 acres to 175 acres or a decline from 36 percent cover (forested acres/potential cover) to four (4) percent cover. In General Forest, the decline would be from 337 acres or 43 percent of the forested acres being cover, to two (2) acres and less than one (1) percent cover. In the Pumice Springs OGMA summer range, the decline would be from 113 acres or 33 percent of the forested acres being cover, to 73 acres or 21.6 percent cover. Alternative 3 retains more cover on Pine Mountain and in the General Forest area. On Pine Mountain, there would be 266 acres of cover or seven (7) percent of the forested/potential cover area. In the General Forest area, 53 acres of cover, or also approximately seven (7) percent of the forested potential cover acres, would remain in cover. The much smaller Pumice Springs OGMA would see a greater reduction of cover from Alternative 3. Approximately 90 acres of cover would be removed leaving six (6.8) percent remaining.

Hiding cover reductions would be greater in non-commercial harvest units or areas where trees up to eight (8) inches dbh would be felled. Hiding cover in these types of stands is primarily associated with tree boles. Alternative 2 treats 7,205 acres using non-commercial harvest whereas Alternative 3 treats 4,385 acres. Recovery of hiding cover on those acres would likely take up to 10 to 20 years depending on site.

Existing habitat would also be maintained by retaining 10 percent of each vegetation and fuel reduction unit in an untreated condition under Alternative 2. Alternative 3 would retain 20 percent of each unit in

an untreated state. Untreated areas would range in size from 0.5 to approximately six (6) acres in size and include dense thickets and other unique habitats such as rock outcrops. The thickets would provide a combination of thermal and hiding cover. Untreated areas would be retained around unique habitats to help retain the habitat characteristics for the species using those habitats. Both alternatives would meet the standard for treated black bark pine stands.

In the long-term, more than 10 years, the impacts of both insects and wildfire on hiding cover would be expected to be less under both Alternatives 2 and 3 than no treatment under Alternative 1. Harvest treatments, including both commercial and non-commercial thinning, and fuel reduction treatments that include the removal of all or most of the understory trees reduce stocking levels thereby helping to maintain or improve both individual tree and stand health and vigor. The residual trees are more resistant to insect attack and more likely to survive attacks if they occur. Alternatives 2 and 3 would also remove or break up both vertical and horizontal fuel loadings, reducing the risk of a high intensity fire, reducing flame lengths, and reducing the risk of a ground fire climbing into the overstory canopy. Wildfire could eliminate or reduce cover and browse on large continuous blocks of landscape. By breaking up fuel continuities, reducing or eliminating ladder fuels, and fuel loading the intensity and risk would be lower. The risk of a crown fire would be reduced by reducing or eliminating ladder fuels and reducing fuel loadings. Existing large diameter, mature, and old growth aged overstory trees are more likely to survive fire events due to the removal of vertical fuels. This would result in the retention of more existing habitat for old growth dependant species. Structural diversity would be maintained. Losses of cover and browse would be localized and small in area. The resultant vegetation mosaic would provide an increased resiliency to future disturbance and provide a diversity of habitats for a wider array of wildlife species. Low intensity fires would also be more likely to retain more hiding and thermal cover.

**Alternative 2 and 3 (Forest Plan Consistency): N**either action alternative would meet the LRMP standard and guidelines of 30 percent requirements for hiding cover in non-black bark stands for summer range hiding cover areas, and particularly not on Pine Mountain. *Implementation Unit* (IU) 52 on Pine Mountain includes no lands outside of the planning area. Summer range (Figure 3-2, see next page) is only located in the scenic views (MA-9) and old growth (MA-15) land allocations. Hiding cover in this IU would decline from the current 36 percent to four (4) percent under Alternative 2 and to 6.5 percent under Alternative 3, which includes the retention patches (i.e. 10 percent, Alternative 2; 20 percent Alternative 3). Recovery to pretreatment levels would likely take up to several decades under Alternative 2 and longer under Alternative 3.

*Implementation Unit* 57 contains lands both within and outside of the planning area boundary. Reference Table 3-10 for treatments in Implementation Units. The portion of the IU outside the planning area is designated as General Forest (MA-8). Hiding cover in this IU would decline from the current 29 percent to 27.8 percent under Alternative 2 and to 26 percent under Alternative 3. A non-significant forest plan amendment (Amendment #2) is proposed that would waive the hiding cover requirement for stands located in summer range areas on Pine Mountain and Pumice Springs.

**Figure 3-2 Deer Summer Range Areas Affected by Proposed Forest Plan Amendment for Hiding Cover**.

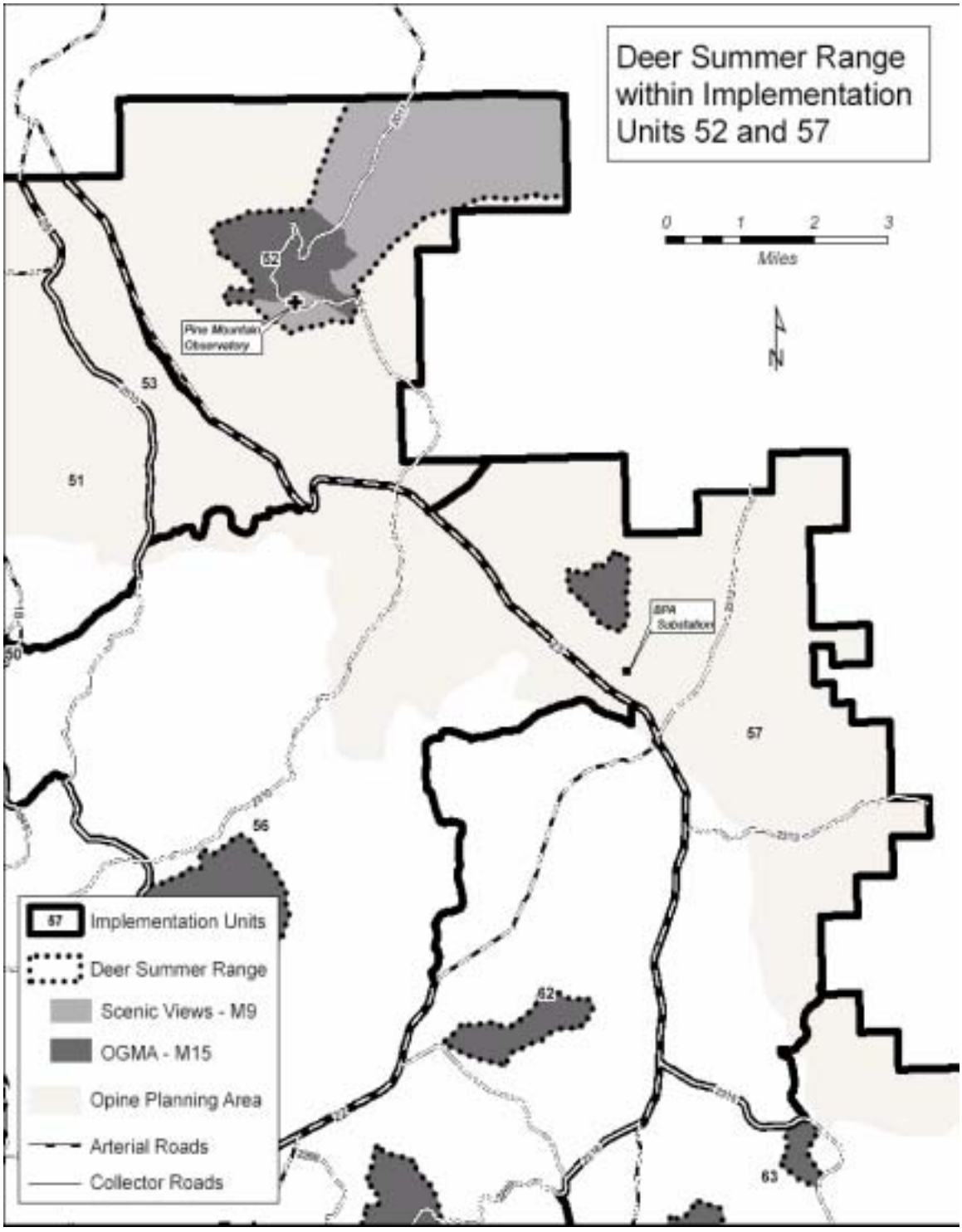


Table 3-11 displays the projected effects of proposed treatments on summer range hiding cover within that portion of the *Implementation Unit* (IU) 52 outside of the MA-7 deer habitat land allocation (MA-9 and MA-15 allocations), and IU 57. The table does not include summer range from the MA-8 general forest allocation because all treatments in that allocation are located within black bark ponderosa pine stands. As noted previously, both alternatives would meet the cover requirement within treated black bark stands.

**Table 3-11 Implementation Units -Effects for Vegetation and Fuel Treatments on Hiding Cover in Summer Range Areas**

| Sub-Area | Current Cover | Fuels Treatment Effects | | Vegetation Treatment Effects[12] | | Post-Treatment Cover | |
|---|---|---|---|---|---|---|---|
| | | Alt. 2 | Alt. 3 | Alt. 2 | Alt. 3 | Alt. 2 | Alt. 3 |
| IU #52 (Pine Mountain WRHU) (4042 forested ac., gross 4791 ac.)[40] | 1445 ac. (36% of forested/potential cover) | -240 ac. | - 130 ac. | -1030 ac. | -1049 ac. | 175 ac. (4%) | 266 ac. (6.5%) |
| IU #57 (Mahogany-Lavacicle WRHUs) (3162 forested acres, gross 3307 ac.)[40] | 918 ac. (29% of forested/potential cover) | na | na | -40 ac. | -90 ac. | 878 ac. (27.8%) | 828 (26%) |
| Pumice Springs OGMA [sub-set of IU #57; 338 forested acres][41] | [113 ac.; 33% of forested/potential cover] | na | na | [-40] | [-90] | [73; 21.6%] | [23; 6.8%] |
| Totals: 7204 forested ac. | 2363 ac. (32.8%) | | | 1053 ac. (14.6%) | | 1094 ac. (15%) | |

Alternatives 2 and 3 have a lower risk of a bark beetle epidemic, especially in treated stands, because conditions in those stands would not promote epidemic insect levels. Untreated stands would continue to have high and/or increasing risks of such attacks, but large landscape level attacks are less likely due to the mosaic of stand conditions created through both vegetation and fuel treatments. Both alternatives also have a lower risk of a high intensity wildfire, again due to the mosaic of conditions created by vegetation and fuel reduction treatments. Although hiding cover levels are low, and far below LRMP objectives, the likelihood of that cover being lost to insect attack or wildfire is reduced for the next several decades or until stand densities return to current levels.

Alternative 2 would require an amendment for thermal and hiding cover in deer winter range (see Forest Plan Amendment #1, Chapter 1) to be made consistent with the LRMP. Alternative 3 avoids a Forest Plan Amendment to wave the thermal cover objective of 30 percent by avoiding treating thermal cover. Alternative 3 is Consistent with LRMP.

**Alternative 2 and 3 (Forest Plan Amendment):** A non-significant forest plan amendment has been proposed to waive the hiding cover requirement in these two *Implementation Units*. The analysis supporting the plan amendment concluded that the effects on deer would be minimal and short to mid-term in duration. This is due to the relatively large herd area associated with the North Paulina herd, approximately 700,000 acres, the relatively large area of summer range included in that herd area, approximately 400,000 acres, and the relatively small acreage of summer range affected, approximately 2,363 acres (approximately 0.6 percent of the summer range area for the herd).

[40] *IU data is for the summer range portions of the unit only. The allocations include OGMA (1,176 ac.) and Scenic Views (3,615 ac.)..*

[41] *The Pumice Springs OGMA is the only portion of the Mahogany-Lavacicle IU summer range that will have any treatment units.*

Post-treatment cover levels in black bark stands may or may not meet cover requirements within individual treatment units depending in part on pre-treatment cover levels. Many proposed units under both of the action alternatives do not have sufficient cover to meet LRMP requirements. This is at least partially addressed by retaining a portion of each treatment unit in an untreated condition. Alternative 2 would retain 10 percent of each treatment unit in an untreated condition; Alternative 3 increases the percentage to 20 percent. In both alternatives, retention areas would target existing cover areas for retention thereby increasing the potential for meeting cover levels or at least retaining existing levels.

**Cumulative Effects / Cover** - There are no identified cumulative or cumulatively significant effects associated with the implementation of any of the current or on-going activities in conjunction with any of the three alternatives. Cross-country motorized travel would continue to be permitted and non-designated routes would continue to be used and new routes created. Habitat fragmentation would continue and habitat effectiveness would continue to decline.

**Cumulative Effects of Alternative 1:** Since there would be no proposed activities under this alternative there would be no cumulative effects. The potential for negative direct and indirect effects of a large wildfire on big game thermal and hiding cover would continue.

**Cumulative Effects of Alternatives 2 and 3:** The cumulative effects determination for deer has been stratified by winter and summer ranges because the requirements of the LRMP differ between them. The summer range portion will be briefly addressed but is largely beyond the scope of this analysis because of the minor amount of summer range affected by the Opine project. The Opine project will affect 4,387 acres of summer range or less than 1 percent of the North Paulina Deer Herd Sub-Unit area. Project mitigation measures address cover retention in this area. There is a an extensive area (~373,600 acres within the North Paulina Deer Herd Sub-Unit) of summer range adjacent to the Opine Project area that has had no recent project activities. All past, current and planned activities that would affect deer hiding cover meet the minimum of 30 percent retention of cover required by the LRMP with the exception of the small area of summer range on Pine Mountain. Therefore, there is no basis to conclude that there are any negative cumulative effects on deer summer range hiding cover.

The LRMP standards and guidelines for winter range cover is 10 percent for hiding cover and 30 percent for thermal cover. The scope of the effects analysis for winter range (MA7) areas includes the following WRHUs within the North Paulina Sub-Unit deer herd as designated by the ODFW: Lava River, Green Mountain, Arnold, TePee Draw, Pine Mountain, Mahogany, Pot Holes and Lavacicle. Hiding and thermal cover, as influenced by open roads and human disturbance, operate in concert to affect deer and are therefore collectively reviewed for cumulative effects. Past, present and foreseeable future projects that may affect deer habitat components are addressed in the following discussion.

Alternatives 2 and 3 of the Opine Project (i.e. TePee Draw, Pine Mountain, Mahogany, Potholes and Lavacicle WRHUs) would retain, respectively, 8.9 percent and 9.5 percent in hiding cover and 2.6 percent and 2.8 percent in thermal cover (i.e. Alternative 3), post-treatment, within MA7. The Arnold WRHU (i.e. Fuzzy EA) will retain 11 percent in hiding cover, post-treatment, within MA7. The Skeleton wildfire of 1996 totally eliminated hiding and thermal cover over an area exceeding 18,000 acres within the Arnold WRHU including national forest, Bureau of Land Management lands, and private property. This fire reduced thermal cover to below the 30 percent goal of the LRMP.

The ongoing South Bend HFRA project overlaps the Green Mountain and Lava River WRHUs; while the ongoing Oz project is located within the Lava River WRHU. The Green Mountain WRHU currently has 30 percent hiding cover and 24 percent thermal cover. It has been impacted by the 18 Fire of 2003, which eliminated thermal and hiding cover on 3,800 acres. The Lava River WRHU currently has 26 percent hiding cover and 31 percent thermal cover. The South Bend HFRA and Oz projects are

designed to retain all currently existing thermal cover within these WRHUs while meeting or exceeding standards and guidelines for hiding cover.

In summary, for MA7, the LRMP hiding cover requirement meets or exceeds 10 percent with the exception of Alternative 2 (approximately 9 percent cover) of the Opine project. Due to the large stand replacement wildfires discussed above, thermal cover requirement are not met over a large area. The degree of effect on mule deer cannot be quantified because there is no direct correlation between thermal cover and deer numbers. What is known is that in high snow years; the majority of the deer herd moves entirely off of the Deschutes National Forest and utilizes the hundreds of thousands of acres of adjacent BLM lands that have essentially no thermal cover. The Opine and Fuzzy Projects include 72,490 acres of MA7 (48,259 ac. Opine and 24,231 ac. Fuzzy) or 70 percent of the North Paulina Sub-Herd Unit (103,548 acres). The ongoing South Bend and Oz projects will affect about 6,240 acres of MA7 or 6 percent of the North Paulina Sub-Herd Unit. In total, the described projects will affect 76 percent of the North Paulina Sub-Herd Unit. It is likely that there are potential short-term (less than 20 years) negative cumulative effects from the combined impacts of the Opine, Fuzzy, South Boundary, and Oz projects due to the total percentages of MA7 that will be treated and the known conditions of cover in these areas. The herd population data from ODFW indicates that the North Paulina deer herd is well below management objectives (i.e. 55 percent). It should be noted however, that the described effects will be spread out both spatially and temporally across a very large area, and individual projects have adopted various mitigation measures to eliminate or reduce negative effects.

An example of project mitigation is the retention of all existing thermal cover in the Opine (Alternative 3), South Bend and Oz projects. The reduced site capability of winter range habitats at low elevations (e.g. limited precipitation) is one of the contributing factors to the current low levels of thermal cover. However, other variables that are also probable agents include the past railroad logging activities that promoted an even-aged black-bark pine stand without understory regeneration over large areas of these WRHUs. These conditions have reduced the amounts of both thermal and hiding cover for big game. Natural re-growth of trees in these areas through time will recruit more cover.

The availability of habitat components to deer is affected by human disturbance. The principal metric utilized in wildlife habitat assessments to determine effectiveness is motorized road/trail density. Because deer on winter range are much more vulnerable to disturbance at a critical period of their annual life cycle, cumulative effects is more meaningful for that period than for summer range. The degree of effect due to disturbance by vehicles includes a number of variables: road class, traffic volume, traffic type, time of year, amount of cover along road, topography, etc. The amount of habitat affected then is subject to the variables resulting in different effects by road. The Fuzzy project currently has 2.6 miles of roads per square mile, plus an additional .5 miles per square mile of OHV trails. Post-treatment the total density would be reduced to 2.0 miles per square mile.

The Opine project presently has a road/trail density of 4.96 miles per square mile within the project boundary. Post-treatment, the density is projected to be 4.6 miles per mile. The LRMP has different standards for summer range and winter range. For the latter the plan specifies that the density will not exceed 1.0-2.5 miles per square mile. The effects on habitat effectiveness in these areas is magnified by the following factors: 1) low amounts of hiding cover; 2) extensive open areas of open, non-forest habitat types; 3) gentle terrain lacking topographic barriers along roads; and 4) relatively high public use and easy access from a growing urban population. Conversely, future actions include seasonal winter range closures following management activities in the Opine project area, which will reduce road densities to a maximum of 2.5 miles per square mile. For the purposes of cumulative effects, the overall broad effect can be categorized as being positive for the Paulina deer herd within the Opine and Fuzzy project areas.

In conclusion, there is no definitive, quantifiable effect on deer numbers due to cumulative effects. There is, given the evidence presented, a certainty that the sum of effects have contributed to reduced deer numbers. A variety of other variables may also be contributing to low deer numbers, e.g. weather, snow conditions, predators, poaching, road/trail disturbance, disease, etc. Adjacent private lands are being developed and eliminating historic deer wintering habitat, which may be one of the more important impacts on local deer herds. In the long-term, with forest re-growth, travel management, and reduced wildfires, the deer herd numbers will rebound. Additionally, the effects of past wildfires on deer winter ranges have had the most substantial, long-term negative impacts on deer habitats. The assessed management activities are designed to reduce the risk of future catastrophic wildfires, and subsequently impacts to deer. Therefore, the negative cumulative effects described for management actions are short to mid-term and will be a benefit to deer both in the short (reduced fires) and long-term (>20 years, more cover).

**Measurement Standard - Thermal Cover**

Thermal cover is only required in the Deer Habitat allocation (i.e. winter range) and the objectives is 30 percent. There is no exception for black-bark pine stands.

**Thermal Cover –** As noted previously, thermal cover within the planning area is currently below the MA-7 LRMP objective of 30 percent. Across the winter range habitat units (WRHUs), thermal cover percentages range from an average of two (2) to approximately 20 percent with an average of about eight (8) percent. Only six (6) percent, or 1,338 acres, is actually located within the MA-7 allocation Thermal cover increases to nine (9) percent across the entire planning area, including both forested and non-forested acres.

It is unlikely that many of the forested areas in the planning area are biologically capable of sustaining thermal cover objectives specified in the LRMP for the deer winter range land allocation (MA-7). The silviculture report cites a 1978 paper by Barrett, which concluded that ponderosa pine stands with site indices of less than 90 are not capable of providing dispersal habitat on a sustained basis. Thermal cover habitat was defined (Barrett, 1978) as stands with an average diameter of six (6) inches dbh and a canopy closure of at least 25 percent. Site indices across most the planning area is below 90. The research also suggests that stands seven (7) inches dbh or smaller might meet thermal cover, but only at the high end of the upper management zone. Stands above seven (7) inches dbh can only meet the 40 percent canopy closure if managed above the upper management zone and at stocking levels so high that beetle outbreaks are likely (Silviculture Report, Appendix D Silvicultural Specialist Letters, page 53).

**Alternative 1 (Thermal Cover):** There would be no substantial short-term change (less than 10 years) in the acreage or percent of thermal cover in the planning area. Under Alternative 1, the number of acres rated as either marginal or acceptable thermal cover would be expected to increase in the short-term assuming no disturbance from wildfire, insects, or disease. The quantity, quality, and distribution of thermal cover may increase during this time period due to increasing stand densities. These same acres are also rated as moderate to high risk for bark beetle attack. Fuel loadings would continue to increase resulting in an increased risk and potential for a high intensity wildfire that would likely result in the loss of both tree and shrub vegetation over very large areas. Such losses would eliminate existing thermal cover as well as hiding cover and bitterbrush browse for mule deer.

Long-term, more than 10 years and assuming no disturbance events such as bark beetle attack or a wildfire, the quantity, quality, and distribution thermal cover could be expected to increase due to continuing increases in stand densities. Increasing stand densities would result in an increasing risk to insect and/or disease outbreak, especially in densely stocked ponderosa pine stands, and a high risk of wildfire. Both events, either singly or in combination, would result in significant reductions if not the

complete loss of thermal cover in affected areas. Alternative 1 has the greatest risk of a bark beetle attack and/or potential for a high intensity wildfire that would likely result in the loss of all or most the existing cover.

Impacts to soils and vegetation from a wildfire given the relatively low quality of these sites could take multiple decades if not a century or longer. This is evident by large areas within the 1959 Aspen Flats fire, which at present remain devoid of thermal and hiding cover, 47 years later. A wildfire ignited today is more likely to be of a higher intensity due to greater fuel loadings.

The more recent Skeleton, Paulina, and Evans West fires have also eliminated large areas of both tree and shrub cover, including important browse species such as bitterbrush. Local experience suggests that recovery of bitterbrush will also likely take several decades. Without planting, recovery of thermal cover to current levels would likely take multiple decades depending upon the severity and intensity of the fire.

Bark beetle attack and wildfire events would be expected to have less impact in lodgepole pine stands. Similar to such events in ponderosa pine, existing thermal cover would be lost. The generally rapid regeneration characteristic of lodgepole pine and its adaptability to stand replacement fire events suggests that recovery of thermal cover in these stands would likely occur at a much faster rate than in ponderosa pine stands experiencing a similar event. Recovery could occur within 4 to 6 decades.

**Alternative 2 (Thermal Cover):** would result in the removal of 1,727 acres of optimal and acceptable thermal cover. Almost all, 98 percent, of the reduction is associated with vegetation treatments; the remaining 2 percent with fuel reduction treatments. Thermal cover across forested habitats at project scale would decline to 690 acres or 2.6 percent of those acres. Within WRHUs, thermal cover would encompass 665 acres or 2.6 percent of the WRHU acreage. The percentage drop is greatest in the winter range only, declining to 614 acres or 2.8 percent of the acreage.

**Alternative 3 (Thermal Cover):** would result in the removal of approximately the same number of acres as Alternative 2, 1,749 versus 1,727 acres, but results in fewer acres and lower percentages of acceptable and optimal thermal cover. Cover levels would decline to 720 acres or 2.7 percent of the forested habitat acres at project scale; 656 acres or 2.5 percent of the WHRU acres; and 615 acres or 2.8 percent of the winter range only acres. Similar to Alternative 2, almost all, 99 percent, is associated with vegetation treatments; the remaining one (1) percent with fuel reduction treatments.

**Alternatives 2 and 3 (Thermal Cover):** Alternative 2 would result in a decline in thermal cover, including optimal and acceptable, from nine (9) percent of the acres across the entire planning area to 2.6 percent. Under Alternative 3, existing optimal thermal cover would be retained by including it in the retention portion of the unit. No optimal thermal cover would be lost under this alternative and would remain at less than 2 percent across the planning area. Within WRHUs, the decline under Alternative 2 would be from the current eight (8) percent average to 2.6 percent. There would be no change under Alternative 3 which would remain at 1.9 percent. Post-thinning canopy closures would drop to approximately 20 percent in treated stands under both alternatives. Areas targeted for vegetative treatments contain the higher quality cover, particularly thermal cover. But these acres also are at the highest risk for bark beetle infestation. Although such treatments result in an immediate short-term reduction in cover, over the longer term, cover levels, both thermal and hiding, would be expected to slowly increase.

Pretreatment of understory trees, trees four (4) inches dbh and less, during post-harvest fuel reduction treatments would result in very little loss of thermal cover habitat. Cover in these tree sizes is primarily associated with foliage (i.e. hiding cover). Evidence from treatments in other similar stands suggests

that the reduction in cover assuming all trees four (4) inches dbh and smaller are removed is estimated at approximately 2.6 percent. This is attributed to the duel overlapping canopies of the understory and overstory trees (Silviculture Report, page 26).

Thermal cover within the General Forest land allocation is generally not available for use by mule deer during the critical winter months because of its location at elevations above both biological and land allocation winter range. Although the decrease in thermal cover within that LRMP allocation has the greatest percentage decline under both alternatives; 90 percent (248 acres existing; 25 acres remaining) under Alternative 2 and 74 percent (248 acres existing, 64 acres remaining) under Alternative 3; the effects on wintering mule deer under normal conditions would be difficult to measure. For example, heavy snow winters when deer move off Forest, areas are inaccessible to deer and the effect would be negligible.

Thermal Cover - Table 3-12 displays the effects of vegetation and fuel reduction treatments on the acres of thermal cover present in the planning area by Alternatives 2 and 3. Thermal cover acres only include optimal and acceptable cover; i.e. stands that contain canopy closures of 30 percent or greater.

**Table 3-12 Effects of Vegetation and Fuel Reduction Treatments on Thermal Cover for Alternatives 2 and 3**

| WRHU or LRMP Allocation | Current Thermal Cover (Alt 1) | | Post-Treatment Cover Reductions | | | | Forested Habitats (Acres of Potential Thermal Cover) | | Post-Treatment Thermal Cover (Pct Forested Habitats / Pct desired condition 30% in WRHUs) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Acres of Optimal | Acres of Acceptable | Optimal | | Acceptable | | | | | |
| | | | Alt 2 | Alt 3 | Alt 2 | Alt 3 | Alt 2 | Alt 3 | Alt 2 | Alt 3 |
| General Forest[42] | 5 | 243 | -4 | -4 | -219 | -180 | 782 | 782 | 25 / 3% | 64 / 8% |
| Lavacicle | 0 | 297 | 0 | 0 | -219 | -224 | 1,465 | 1,465 | 78 / 5% | 73 / 5% |
| Mahogany | 35 | 430 | -28 | 0 | -133 | -133 | 5,912 | 5,912 | 304 / 5% | 332 / 5.6% |
| Pine Mountain (summer range only) | 421 | 523 | -400 | -415 | -345 | -412 | 5,077 | 5,077 | 199 / 4% | 117 / 2.3% |
| Pine Mountain (winter range only) | 0 | 113 | 0 | 0 | -2 | -37 | 1,123 | 1,123 | 111 / 10% | 76 / 6.7% |
| Potholes | 5 | 105 | -5 | 0 | -53 | -49 | 5580 | 5,592 | 52 / 1% | 61 / 1% |
| TePee Draw | 19 | 334 | -19 | 0 | -302 | -280 | 7,734 | 7,734 | 32 / <1% | 73 / 1% |
| Totals:<br>WRHU<br>Winter Range Only | 485 | 1,932 | -456 | 0 WR only; 419 gross | -1,271 | -1,278 | 26,550<br>25,768<br>21,814 | 26,550<br>25,768<br>21,814 | 690 / 2.6%<br>665 / 2.6%<br>614 / 2.8% | 720 / 2.7%<br>656 / 2.5%<br>615 / 2.8% |

[42] Thermal cover in the general forest allocation and Pine Mountain summer range is included because elk are more dependant upon thermal cover during summer months than mule deer.

The analysis assumes that the vegetation treatments include medium and small tree thinning and that the fuel reduction treatments include understory pre-treatments (thinning trees less than four (4) inches dbh). The analysis also assumes that any medium or small tree thinning would reduce canopy closure levels to 30 percent or less and thereby removing it as thermal cover. It further assumes that pre-treatment activities degrade thermal cover by eliminating that portion of the canopy that can benefit deer, specifically trees greater than five (5) feet in height. It is quantified as a reduction of 10 percent of the canopy cover. Reductions were applied to the optimal and acceptable cover categories. Those acreages where post-treatment cover levels were reduced to either the marginal or non-cover categories are displayed in the "post-treatment cover reductions" columns for each alternative. The analysis does not include or reflect the retention of 10 (Alternative 2) or 20 percent (Alternative 3) of each treatment unit in an untreated state for acceptable thermal cover. This is because these retention clumps or patches are to be distributed across the treatment unit to meet a variety of objectives, such as hiding and thermal cover, structural and vegetative diversity, and cannot be assumed to exclusively provide thermal cover. Under Alternative 3, 100 percent of existing optimal thermal cover patches would be retained regardless of distribution.

In the long-term, more than 10 years, continued growth in forested areas would be expected to result in a continuing increase in canopy closure levels and potentially increasing the amount and distribution of thermal cover. Alternative 1 would be expected to experience the greatest increase in the number of acres having canopy closures greater than 30 percent. Alternatives 2 and 3 would have smaller acreage increases with most or all associated with untreated areas that are near 30 percent canopy closure at the present time.

The risk of bark beetle attack and the subsequent long-term loss of thermal cover would be greatly reduced on treated acres. As thermal cover levels increase, the risk of bark beetle attack also increases. Assuming that efforts to minimize the risk of bark beetle attack through stand density management would continue into the future, it is unlikely under either action alternative that thermal cover levels would be allowed to reach current levels. It is therefore also unlikely that the current LRMP objective of 30 percent thermal cover in deer winter range would ever be met or sustained on a large scale.

Similarly, increasing fuel loadings, including the development of ladder fuels and the retention of flammable shrub species, also would continue to place existing and developing thermal cover at risk of loss or destruction, particularly over the long-term.

**Cumulative Effects -Thermal Cover** -There are no identified cumulative or cumulatively significant effects associated with the implementation of any of the current or on-going activities in conjunction with Alternatives 1 and 3. The seasonal area closure from December 1 to March 31 will reduce the harassment and stress to deer during the colder winter months, which should improve their health and survivability by maintaining more body fat. [See above section for cumulative effects / cover]

**Measurement Standard - Bitterbrush Age/Structure Ratio**

The LRMP requires that a mixture of shrub age classes be provided in Deer Habitat (M7-14) to ensure good forage availability for mule deer. The LRMP goal is to optimize habitat conditions within the Deer Habitat allocation. Additionally, the Integrated Fuels Management Strategy (1998), which was done in cooperation with the Oregon Department of Fish and Wildlife, recommended a ratio of 1/3$^{rd}$. early, 1/3$^{rd}$. mid and 1/3$^{rd}$. late age/structure stages of bitterbrush as a desired condition in Deer Habitat.

Table 3-12 compares the acres of the various fuel reduction treatments by alternative within the planning area. The analysis assumes that tree thinning would result in the conversion of approximately 25 percent of the existing bitterbrush acres to an early stage. Thinning combined with a follow-up

broadcast burn or a follow-up dripline burn would result in the conversion of approximately 75 (broadcast burned) and 40 (dripline burned) percent of existing bitterbrush acres to an early stage. A broadcast burn with no thinning is assumed to result in the conversion of approximately 70 percent of the existing bitterbrush acres to an early stage whereas a dripline burn without thinning would result in the conversion of approximately 40 percent of those acres. Thinning with mowing or mowing without thinning are assumed to result in the conversion of approximately 80 percent of the bitterbrush acres to an early stage.

The late and decadent classes contain a large portion of the bitterbrush population, almost two thirds (approximately 65 percent). The desired condition over the long-term is to have approximately one third each in the early, mid, and late/decadent classes per INFMS and MA 7 goal to "optimize" habitat conditions.

Table 3-13 summarizes the acreage and percentage of bitterbrush by age class and structure resulting from implementation of each of the alternatives. Table 3-14 summarizes by WRHU LRMP land allocation, alternative, and age class/structure category, the projected changes in age class/structure associated with proposed vegetation and fuel reduction treatments under Alternatives 2 and 3.

Nine (9) percent of the planning area, 4,998 acres, has plant associations that have no potential for bitterbrush. The remaining 49,625 acres either currently have bitterbrush present or have the potential for it to be present. The figures in the table reflect only the acres with bitterbrush present or have the potential to have it present. Due to the rounding of numbers, percentages and acres may not total 100 percent or 49,625 acres.

**Table 3-13 Bitterbrush Age Class/Structure by Alternative**

| Age Class/Structure Stage | Alt 1 | | Alt 2 | | Alt3 | |
|---|---|---|---|---|---|---|
| | Acres | Percent | Acres | Percent | Acres | Percent |
| Early | 12,734 | 26 | 22,922 | 46 | 21,234 | 43 |
| Mid | 4,871 | 10 | 2,279 | 5 | 2,589 | 5 |
| Late | 15,387 | 31 | 11,668 | 24 | 12,380 | 25 |
| Decadent | 16,633 | 34 | 12754 | 26 | 13,324 | 27 |

**Alternative 1 (Bitterbrush Age/Structure Ratio):** Under Alternative 1, 65 percent of the bitterbrush acres, 32,020 acres would remain in the late seral stage (late and decadent age class/structure groups). This is almost double the desired level of 1/3$^{rd}$ of the acres being in this stage. Both the early, with 12,774 acres (26 percent) and the mid, with 4,878 acres (10 percent) would remain below the desired goal of 1/3$^{rd}$ of the acres in each seral stage.

Under Alternative 1, there would be no thinning or fuel reduction treatments and therefore, no existing bitterbrush acres would revert to an early seral stage. Bitterbrush would continue to be concentrated in the late and decadent age class and structural stages. The percentage of the bitterbrush in these two classes would continue to increase in the long-term. Percentage would decrease in both the early and mid classes over the long-term and assuming no large scale wildfire.

Shrubs in both early and mid classes and shrub-grass habitats would continue to decrease in distribution and quality due to encroaching trees. Shrub habitats would continue to age with a greater proportion of shrubs moving into late seral stages. Mature shrubs that are above snow levels and accessible to mule deer during winter months would increase in abundance, but nutritional quality would decline as the shrubs aged. Browse, particularly bitterbrush for wintering mule deer, would decline in numbers, distribution, and quality as tree canopies shaded out existing shrubs. Forage species, particularly grasses and forbs, that provide high nutritional quality during spring and early summer periods would decrease in both abundance and diversity as the combination of increasing litter accumulation, maturation of shrub habitats, and the lack of disturbance. Nesting, brood rearing, and foraging habitat for the greater sage-grouse would also decline in size, distribution, and quality. Increasing numbers of trees would provide additional perch sites for birds preying on sage-grouse.

This alternative would also retain the high risk of wildfire and the potential loss of critical winter browse (bitterbrush). Over time, the risk of wildfire and the degree of potential loss of bitterbrush may increase. In addition to forgoing the opportunity to reduce the risk of wildfire, it also forgoes the opportunity to improve the abundance of herbaceous forage by reducing tree canopy cover.

**Alternative 2 and 3 (Bitterbrush Age/Structure Ratio):** The analysis indicates an insignificant difference between Alternatives 2 and 3. Both retain acreages and percentages of early seral bitterbrush at levels above the desired condition, 46 and 43 percent versus 33 percent. Both alternatives reduce the percentage of mid seral by 50 percent to approximately five (5) percent, well below the desired condition. Both also retain over 50 percent in late and decadent and also well above the desired condition.

The differences between Alternatives 2 and 3 are primarily associated with treatment activities proposed in the Tepee Draw WRHU and, to a lesser extent, in the General Forest land allocation (Table 3-13) Alternative 3 retains a greater percentage of bitterbrush acres in the late/decadent seral stages in the Tepee Draw area, 19 and (32) percent respectively, versus the 20 percent and (31) percent retained under Alternative 2. Alternative 3 also results in fewer acres and a lower percentage of acres in the early seral stage following treatment than Alternative 2 in the same area; 39 versus 49 percent (currently 12 percent). The situation is reversed in the General Forest allocation where treatments proposed under Alternative 3 result in a greater percent of bitterbrush acres in the early seral than Alternative 2; 83 versus 74 percent (currently 48 percent). Most of this change in both alternatives is associated with treatments in decadent age class/structure bitterbrush stands.

**Table 3-14 Vegetation and Fuel Reduction Treatments on Bitterbrush Age Class/Structure by LRMP Allocation, WHRU, and Alternatives 2 and 3.**

| WRHU or LRMP allocation | | Age Class / Structure (acres / % of Shrub Acreage) | | | | | | | | Total Ac. / % of Area | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Early | | Mid | | Late | | Decadent | | | |
| | | Alt 2 | Alt 3 | Alt 2 | Alt 3 | Alt 2 | Alt 3 | Alt 2 | Alt 3 | Alt 2 | Alt 3 |
| General Forest | Existing | 464 / 48 | 464 / 48 | 150 / 16 | 150 / 16 | 130 / 13 | 130 / 13 | 223 / 23 | 223 / 23 | 972 / 2 (shrub 967 ac.) | 972 / 2 (shrub 967 ac.) |
| | Change | +256 | +334 | -110 | -110 | -85 | -84 | -62 | -140 | | |
| | Total | 720 / 74 | 798 / 83 | 40 / 4 | 40 / 4 | 45 / 5 | 46 / 5 | 161 / 17 | 83 / 9 | | |
| Lavacicle | Existing | 1,581 / 24 | 1,581 / 24 | 0 / 0 | 0 / 0 | 4,343 / 65 | 4,343 / 65 | 772 / 12 | 772 / 12 | 7,487 / 14 (shrub 6,696 ac.) | 7,487 / 14 (shrub 6,696 ac.) |
| | Change | +508 | +539 | -0 | -0 | -438 | -466 | -70 | -73 | | |

| WRHU or LRMP allocation | | Age Class / Structure (acres / % of Shrub Acreage) | | | | | | | | Total Ac. / % of Area | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Early | | Mid | | Late | | Decadent | | | |
| | | Alt 2 | Alt 3 | Alt 2 | Alt 3 | Alt 2 | Alt 3 | Alt 2 | Alt 3 | Alt 2 | Alt 3 |
| | Total | 2089 / 31 | 2,120 / 32 | 0 / 0 | 0 / 0 | 3,905 / 58 | 3,877 / 58 | 702 / 10 | 699 / 10 | | |
| Mahogany | Existing | 4,570 / 53 | 4,570 / 53 | 94 / 1 | 94 / 1 | 1,805 / 21 | 1,805 / 21 | 2,085 / 24 | 2,085 / 24 | 12,112 / 22 (shrub 8,554 ac.) | 12,112 / 22 (shrub 8,554 ac.) |
| | Change | +19 | +17 | 0 | 0 | -2 | -2 | -16 | -15 | | |
| | Total | 4,589 / 54 | 4587 / 54 | 94 / 1 | 94 / 1 | 1,803 / 21 | 1,803 / 21 | 2,069 / 24 | 2,070 / 24 | | |
| Potholes | Existing | 2,608 / 27 | 2,608 / 27 | 466 / 5 | 466 / 5 | 1,809 / 19 | 1,809 / 19 | 4,780 / 49 | 4,780 / 49 | 9,690 / 18 (shrub 9,663 ac.) | 9,690 / 18 (shrub 9,663 ac.) |
| | Change | +2,800 | +2633 | -312 | -291 | -873 | -802 | -1,616 | -1,540 | | |
| | Total | 5,408 / 56 | 5,241 / 54 | 154 / 2 | 175 / 2 | 936 / 10 | 1,007 / 10 | 3,164 / 33 | 3,240 / 34 | | |
| Pine Mtn | Existing | 2,150 / 17 | 2,150 / 17 | 3,221 / 25 | 3,221 / 25 | 3,908 / 30 | 3,908 / 30 | 3,547 / 28 | 3,547 / 28 | 13,443 / 25 (shrub 12,688 ac.) | 13443 / 25 (shrub 12,688 ac.) |
| | Change | +2,669 | +2,244 | -1,707 | -1,664 | -492 | -606 | -302 | -295 | | |
| | Total | 4,819 / 38 | 4,394 / 33 | 1,514 / 12 | 1,557 / 12 | 3,416 / 25 | 3,302 / 26 | 3,245 / 25 | 3,252 / 25 | | |
| Tepee Draw | Existing | 1,361 / 12 | 1,361 / 12 | 940 / 9 | 940 / 9 | 3,392 / 31 | 3,392 / 31 | 5,226 / 48 | 5,226 / 48 | 10,919 / 20 (shrub 10,919 ac.) | 10,919 / 20 (shrub 10,919 ac.) |
| | Change | +3,936 | +2,943 | -463 | -217 | -1,241 | -1,355 | -1,813 | -1,751 | | |
| | Total | 5,297 / 49 | 4,304 / 39 | 477 / 4 | 723 / 7 | 2,151 / 20 | 2,037 / 19 | 3,413 / 31 | 3,475 / 32 | | |
| Totals | Current | 12,734 / 26 | 2,734 / 26 | 4,871 / 10 | 4,871 / 10 | 15,387 / 31 | 15,387 / 31 | 16,633 / 34 | 16,633 / 34 | 54623 / 100 (shrub 49,625 ac.) | 54,623 / 100 (tshrub 49,625 ac.) |
| | Post-Treatment | 22922 / 46 | 21234 / 43 | 2279 / 5 | 2589 / 5 | 12380 / 24 | 12072 / 24 | 12754 / 26 | 12819 / 26 | | |

Current conditions, which are dominated by the late and decadent age classes, have resulted in an unacceptable level of risk of loss to an uncharacteristic wildfire.

Between 1990 and 1999, a total of 4,992 acres in the Opine planning area had fuel reduction treatments applied to them. Alternatives 2 and 3 both contain proposed treatment units that contain acres treated during that period including approximately 2,284 acres in 14 units under both alternatives. Random reviews of areas treated during that period identified little bitterbrush recovery indicating that areas treated within the past 20 years are highly unlikely to provide adequate browse for mule deer due to the slow recovery of the bitterbrush and other forage species. Alternative 2 would retreat those previously treated acres. Maintenance treatments would likely result in a long-term delay in shrub recovery, which would result in poor spatial distribution of critical winter forage for mule deer. Alternative 3 would not treat any area treated within the past 20 years unless those acres were determined to have recovered. This would permit shrub recovery to continue and increase the probability of a better distribution of

winter forage. Broadcast burning or burning beneath the driplines of trees across the entire unit would be less desirable because previously treated areas are dominated by Idaho fescue and other fine fuels that increase the risk of a fire carrying over a large portion of the area. Burning beneath the driplines of trees along roads to create a fuel break may also accomplish desired objectives without delaying the recovery of shrubs in those areas or affect the spatial distribution of forage on the landscape.

Alternatives 2 and 3, in addition to reducing fuel loadings and reducing the risk of wildfire, would improve xeric shrub habitats and enhance opportunities for maintaining and improving bitterbrush availability and distribution by removing most of the encroaching juniper on approximately 507 acres under Alternative 2 (units R1A, R1B, R2A, R2B, R3Aeast, and R3Awest) and 235 acres under Alternative 3 (units R1A, R1B, R3Aeast, and R3Awest). An additional benefit would be the maintenance and/or potential increase in forage species – grasses and forbs – that would benefit both wildlife and livestock. Additional forage production would also reduce the risk and potential for livestock to browse bitterbrush and thereby increasing the amount of browse (bitterbrush) available for wintering deer.

Both action alternatives also reduce the risk of an uncharacteristic wildfire event occurring and negatively impacting large areas of existing browse and forage, including the loss of critical winter browse. Application of thinning in forested areas also would help to improve the quantity, quality, and distribution of herbaceous forage species under both alternatives.

Standard and Guideline M7-26 in the LRMP regulates the amount of shrub habitat that can be converted into early seral structure through the use of prescribe fire. This limitation is 2.0 to 2.5 percent of the management area annually. This limitation does not include mowing and does not take into account the effects of wildfire. Implementation of fuels treatments within MA-7-26 are monitored annually by herd unit (North Paulina) and would not exceed the 2.5 percent maximum treatable acres per year under Alternative 2 or 3.

Table 3-15 summarizes the number of acres that are proposed for treatment using prescribed fire either individually or in combination with other methods under each alternative. Each is summarized by WRHU. The last column in the table displays the number of acres that could be converted to an early seral stage each year under this standard and guideline for both the individual WRHU and the planning area. It does not include vegetation units where prescribe fire is applied following commercial and/or non-commercial thinning.

**Table 3-15 Fuel Reduction Treatments[43] in the MA -7 Deer Habitat Land Allocation, Opine Planning Area**

| WRHU | WRHU Acreage | Fire Treatment | Treatment Acreages[44] | | | 2.5% Maximum Treatable Acres / Yr |
|---|---|---|---|---|---|---|
| | | | Alt 1 | Alt 2 | Alt 3 | |
| Lavacicle | 7,445 | Broadcast Burn | 0 | 1,389 | 19 | 186 |
| | | Dripline Burn | 0 | 0 | 1,332 | |
| Mahogany | 11,763 | Pretreat Burn | 0 | 78 | 79 | 294 |
| Pine Mountain | 8,487 | Broadcast Burn | 0 | 1,104 | 419 | 212 |
| | | Dripline Burn | 0 | 220 | 220 | |
| | | Pre-treat Burn | 0 | 3796 | 288 | |
| Potholes | 9,677 | Broadcast Burn | 0 | 3,149 | 2,745 | 242 |
| | | Dripline Burn | 0 | 421 | 421 | |
| | | Pre-treat Burn | 0 | 2,061 | 1,993 | |

[43] Includes fuel treatment acres that overlap vegetation treatment acres.

[44] Number of acres proposed is an estimate and would be refined during implementation by fuels and wildlife specialists.

| WRHU | WRHU Acreage | Fire Treatment | Treatment Acreages[44] | | | 2.5% Maximum Treatable Acres / Yr |
|---|---|---|---|---|---|---|
| | | | Alt 1 | Alt 2 | Alt 3 | |
| Tepee Draw | 10,886 | Broadcast Burn | 0 | 858 | 545 | 272 |
| | | Pre-treat Burn | 0 | 4,885 | 4,240 | |
| Totals | 48,258 | | 0 | 17,961 | 12,301 | 1,206 |

**Alternative 1, 2, and 3 (Bitterbrush Age/Structure Ratio):** Treatments result in a 50 percent reduction in bitterbrush acres in the mid seral stage, from 10 percent under Alternative 1 to five (5) percent under Alternatives 2 and 3. This has consequences for mule deer seeking browse. Bitterbrush is most productive and provides the highest quality browse during this stage. Having a higher percentage of bitterbrush in this stage during critical winter months maximizes nutrient intake while minimizing energy output. Reducing the availability and quality of browse in this seral stage requires mule deer to expand more energy to obtain the same amount of nutrients. This results in an increased risk of not surviving severe weather conditions during the winter months and is likely to affect reproductive rates and success during the following spring months. This may not be a significant problem for most years as observations in the Opine area have determined that during those years snow depths are too great and most deer winter at lower elevations on adjacent ownerships. During years when deer do winter in the area, snow depths would likely make much of the bitterbrush visible and available above the snow regardless of the age and structural class.

Long-term, reducing the acreage of mid-seral bitterbrush, would likely contribute to the lack of replacement in the mature and late seral stages. Lacking replacement, older stages would continue to become more decadent with larger amounts of dead wood that does not provide browse for wintering deer.

The higher than desired percentage of bitterbrush in the late seral stage is expected to mitigate at least some of these impacts. Deer would have to locate and browse more stems to obtain the same level of nutrients, but the greater distribution of plants on the landscape is expected to minimize the impacts.

**Cumulative Effects / Shrub Habitats –** There are no identified cumulative or cumulatively significant effects associated with the implementation of any of the current or on-going activities in conjunction with any of the three alternatives. With the exception of grazing and the control of noxious weeds/invasive plants, none would impact shrub habitats or specifically bitterbrush beyond what is described under current conditions in either the short or long-terms.

Cumulative effects relative to the availability of shrubs for big game foraging are limited to the Deer Habitat, MA7, allocation. There are no standards provided by the LRMP for summer range forage, which limits the scope of cumulative effects analysis on this habitat component. Past treatments and wildfires that have affected shrub age/structure classes have been incorporated into the current condition data. The data clearly documents that the principal potential effects issue is on the mid age/structure class as it is the most deficient as related to the desired condition of providing 1/3$^{rd}$. of the landscape in this class. The lack of past low intensity historic wildfires has created the current conditions situation with excessive amounts of mature/decadent shrub and limited amounts of mid age/structure for recruitment.

Grazing by domestic livestock may impact shrubs that are important to big game species. However, the effect is localized and does not occur each year. Current allotment management plans have built in monitoring strategies to address this potential issue. The treatment of noxious weeds is another

potential impact on shrubs. However, the target species for control with chemicals are not shrubs and overspray (e.g. windy conditions) would be avoided. The relatively small area to be treated is minor in comparison to overall amount and distribution of shrub habitats.

Past and planned timber harvest activities may adversely impact shrubs, but generally this impact does not exceed 25 percent of an area. Planned and future timber harvest will utilize existing skid trails, landings and roads which will mitigate these effects. PDCs have been incorporated into all planned treatments to ensure retention of mature/late shrub age/structure classes within treatment units.

Fuels treatments will have the greatest effect on shrub age/structure classes. Proposed treatments for both action alternatives are targeting the mature/late structure class, however there are units with inclusions of the mid stage. There is a PDC is in place to mitigate these effects on the mid class. There is a limited history in the area on past fuels treatment and their effects have been built into the current condition shrub classes as noted earlier.

In conclusion, the cumulative effect on shrub habitat is not adverse to objectives for big game species forage availability, nor for associated shrub dependent wildlife. Over 50 percent of the winter range area will be retained in the mature/late age/structure class. Large blocks of xeric shrublands will not have any treatments and will continue to provide high value habitats for a variety of wildlife species. No shrub dependent species will be at risk to federal listing due to cumulative effects on them.

**Part 2 of Key Issue #1**
**(b) Effects of Open Road and Motorized Trails on Habitat Effectiveness**

Habitat effectiveness is affected by open road and motorized trail density. The Opine planning area has a current average open road density of approximately 2.97 miles per square mile and a combined average road and motorized trail density of approximately 4.96 miles per square mile. The Fox Butte Cooperative Travel Management Area program (Green Dot system) reduces open road/motorized trail densities to approximately 2.92 miles per square mile during the deer hunting season. Target road densities range from 1.0 to 2.5 miles per square mile within designated deer habitat (M7-22, LRMP page 4-115) and 2.5 miles or less in other land allocations (WL-54 LRMP page 4-58).

Currently 25,976 acres of the planning area are closed to OHV use except on designated roads and trails (East Fort Rock OHV area). The remaining 28,647 acres are currently open to unrestricted motorized use including OHV use. Open roads and unrestricted off-road motorized vehicle use fragment wildlife habitat and disturb wildlife, especially during winter months when animals must use extra energy and resources to stay alive.

***Measurement Standard:***

- Miles of system roads closed and decommissioned.
- Road and motorized trail density.
- Acres closed to unrestricted cross country motorized use.

Habitat effectiveness is primarily influenced by open road and motorized trail density. Big game species generally avoid the areas adjacent to open roads and trails due to the disturbance from the vehicles and people. This effect reduces the amount of or use of available habitat in these areas. A number of variables influence the effects of roads and motorized trails. These include but are not limited to:

- the amount and type of traffic;
- the road and/or trail location;
- vegetation density and pattern; and
- topography.

**Existing Condition for Roads and Motorized Trails**

Table 3-16 displays current road and motorized trail densities within the planning area. These figures include system roads and motorized trails as well as an estimated mileage of non-designated roads and trails within the planning area. The estimated mileage of non-designated roads and trails is a very conservative figure. It was determined using aerial photos and orthophotos in the district GIS system. Many are too small, narrow, or are hidden by tree canopies and are not visible on the aerial photos and orthophotos used for the analysis. Additionally, new routes (roads and trails) have been created since the aerial photos and orthophotos were created and therefore are not present. There is no current formal inventory information available that identifies the length or location of non-designated routes. Road and trail mileages, both system and non-designated, used for the wildlife analyses are based on information from the Deschutes National Forest corporate GIS database.

**Table 3-16 Estimated road and motorized trail density. Includes both system and non-designated roads and motorized trails**

| Habitat Unit | Miles of System Roads | Miles Designated (System) Motorized Trails | Est. Miles Non-designated Roads & Trails | Habitat Square Miles | Estimated Existing Road & Trail Miles (System & Non-designated) | Existing Density (Miles / Sq. Mile) Roads & Motorized Trails | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | System Roads | System Roads & Designated Trails | System & Non-designated |
| General Forest (non-winter range) | 5.69 | 3.32 | 0 | 1.50 | 9.01 | 3.79 | 6.01 | 6.01 |
| Lavacicle WRHU | 40.56 | 0 | 2.89 | 11.70 | 43.45 | 3.47 | 3.47 | 3.71 |
| Mahogany WRHU | 68.86 | 12.46 | 4.97 | 18.93 | 86.29 | 3.64 | 4.30 | 4.56 |
| Pine Mtn WRHU (total) | 45.73 (18.23 / 27.5)[45] | 0 | 6.29 | 21.01 | 6.29 | 2.18 | 2.18 | 2.48 |
| Potholes WRHU | 61.19 | 49.52 | 7.56 | 15.14 | 118.27 | 4.04 | 7.31 | 7.81 |
| Tepee Draw WRHU | 72.72 | 34.17 | 6.88 | 17.01 | 113.77 | 4.28 | 6.28 | 6.69 |
| Totals | 133.91 | 99.47 | 28.59 | 85.29 | 377.08 | 3.47 | 4.63 | 4.97 (average) |

**Road Density in Winter and Non Winter Range Habitat Unit:** System road density within the planning area averages approximately 2.97 miles per square mile. Densities vary from a low of 2.18 miles per square mile within the Pine Mountain WRHU to a high in the Tepee Draw WRHU of approximately 4.28 miles per square mile. Adding the approximately 100 miles of designated motorized trails associated with the East Fort Rock trail system, the average road and motorized trail density increases to an average of 4.96 miles per square mile. The Pine Mountain WRHU has the lowest road and motorized trail density at 2.18 miles per square mile due to the lack of designated motorized trails. Due to the high mileage of motorized trails within the WRHU boundary, the Potholes WRHU has the highest average road and motorized trail density at approximately 7.31 miles per square mile. Adding the mileage of non-designated roads and trails, a conservative estimate due to the lack of up-to-date inventory, increases the density of roads and motorized trails to almost five (5) miles per

[45] Miles of system roads in winter range and non-winter (OGMA and scenic views land allocation) portions of the Pine Mountain WRHU.

square mile for the planning area. The Pine Mountain WRHU retains the lowest average density at approximately 2.48 miles per square mile with the Potholes WRHU having the highest density (system/designated) at approximately 7.81 miles per square mile.

As previously noted, during the deer hunting season, motorized travel, including OHV use, is restricted to designated roads within the Fox Butte Cooperative Travel Management Area. Open roads within it are identifed with a reflective green dot hence the name – Green Dot System. This closure includes a portion of the designated motorized trails in the East Fort Rock (EFR) OHV trail system. OHV use is only permitted on designated routes during this period. Table 3-17 displays the effect of this system on road density within the planning area during hunting season.

**Table 3-17 Road and Motorized Trail Density Associated with the Fox Butte Cooperative Travel Management Area Road Closures**

| Habitat Unit | Green Dot Road Miles | Road Miles Outside Green Dot Area | Total Road Miles | Road Density (Miles/ Square Mile) |
|---|---|---|---|---|
| Non-winter range | .09 | 8.10 mi. | 8.19 | 5.46 |
| Lavacicle WRHU | 5.06 | 0 | 5.06 | .43 |
| Mahogany WRHU | 12.94 | 0 | 12.94 | .68 |
| Pine Mountain WRHU | 25.18 | 0 | 25.18 | 1.20 |
| Potholes WRHU | 6.86 | 78.24 | 85.10 | 5.62 |
| TePee Draw WRHU | 1.36 | 111.39 | 112.75 | 6.61 |
| Total | 51.49 | 197.73 | 249.22 | 2.92 (average) |

Interagency enforcement has been effective and the closures have signficantly reduced open road densities in the included areas.

**Open Road Densities by Implementation Units (LRMP Consistency):** Open road densities expected under each alternative, including the No Action Alternative, are displayed in Table 3-18. This information was generated through Forest and District GIS databases.

**Table 3-18 Open Road Density by Implementation Unit and Alternative.**

| Implementation Unit Number | Implementation Unit Area (Square Miles) | Current Open Road Mileage | Open Road Density (Miles/Square Mile | | |
|---|---|---|---|---|---|
| | | | Alt. 1 | Alt. 2 | Alt. 3 |
| 47 | 48.31 | 145.83 | 3.02 | 3.02 | 3.02 |
| 50 | 49.00 | 154.67 | 3.15 | 3.14 | 3.12 |
| 51 | 29.09 | 83.56 | 2.87 | 2.79 | 2.71 |
| 52 | 21.43 | 44.76 | 2.09 | 2.00 | 1.76 |
| 53 | 4.98 | 7.82 | 1.57 | 1.57 | 1.21 |
| 56 | 39.65 | 65.83 | 1.66 | 1.66 | 1.66 |
| 57 | 25.25 | 91.56 | 3.63 | 3.39 | 2.88 |
| 62 | 28.49 | 112.47 | 3.95 | 3.95 | 3.95 |
| 63 | 39.17 | 135.72 | 3.46 | 3.46 | 3.44 |

There is no change in open road density in three of the *Implementation Units*: 47, 56, and 62. *Implementation Unit* (IU) 56 is currently below and would remain below 2.5 miles per square mile. Both IU 47 and 62 remain above the target density at 3.02 and 3.95 miles per square mile. It should be noted that only small portions of the planning area overlap these latter two implementation units.

Of the remaining six (6) *Implementation Units*, only two, IU 52 and 53 would be below the target open road density under all three alternatives. The remaining three *Implementation Units*, 50, 51, and 57, all remain above the target density. IU 50 would see a small drop in road density from the existing 3.15

miles per square mile to 3.12 miles per square mile under Alternative 3. IU 51 would see a somewhat greater reduction, from 2.87 miles to 2.71 miles per square under Alternative 3. IU 57 experiences the greatest decrease in open road density, 0.75 miles per square mile, but would still remain above the target density at 2.88 miles per square mile.

**Open Road and Motorized Trail Densities by Winter Range Habitat Unit or LRMP Allocation:**

**Alternatives 1, 2, and 3:** Table 3-19 displays open road and motorized trail density by alternative. This analysis uses road mileages from the GIS database which does not correspond to the road mileages maintained in the district roads database. GIS data does not easily account for road mileages where terrain is variable whereas the district roads database information is based on actual road mileage figures collected from on-site measurements. Densities generated using the roads database would be expected to be somewhat lower than those displayed in the following tables. Figures for Alternatives 2 and 3 are following closure and/or decommissioning of roads. They also include an estimated 29 miles of non-authorized roads and trails. The figures do not reflect reductions associated with proposed seasonal closures, i.e. designated open roads only from December 1 through March 31 each year in winter range.

**Table 3-19 Road and Motorized Trail Densities by Alternative**

| Winter Range Habitat Unit or LRMP Allocation | Road & Motorized Trail Density (mi. / sq. mi.) | | |
|---|---|---|---|
| | Alt 1 | Alt 2 | Alt 3 |
| General Forest | 6.43 | 6.43 | 5.69 |
| Lavacicle WRHU | 3.95 | 3.86 | 3.17 |
| Mahogany WRHU | 4.47 | 4.03 | 3.91 |
| Pine Mountain WRHU | 2.48 | 2.29 | 2.34 |
| Potholes WRHU | 7.90 | 7.74 | 7.58 |
| TePee Draw WRHU | 6.60 | 6.47 | 6.39 |
| Planning Area Average | 4.96 | 4.77 | 4.6 |

With the exception of the Pine Mountain WRHU, all of the other areas analyzed have road and motorized trail densities that exceed levels recommended in the literature as well as those in the LRMP under all alternatives. Despite the relatively high densities, any reduction below current levels would reduce the risk of harassment and decrease the level of habitat fragmentation. This, in turn, would increase the effectiveness of what cover, hiding and thermal, remained on the landscape. The LRMP has no standards and guides for the combination of roads and motorized trail densities.

In contrast, current research suggests that all motorized travel affects big game and big game habitat, the LRMP standards and guidelines only address road densities. Table 3-20 displays the effects of the proposed road closures and decommissioning on road densities only.

**Table 3-20 Road Density by Alternative and LRMP or WRHU Unit.**

| WRHU or LRMP Allocation | Land Allocation(s) | Target Road Density (mi / sq. mi) | Road Density (mi. / sq. mi.) | | |
|---|---|---|---|---|---|
| | | | Alt 1 | Alt 2 | Alt 3 |
| General Forest | MA-8 | 2.5 | 3.92 | 3.92 | 3.92 |
| Lavacicle WRHU | MA-7 | 1.0 - 2.5 | 3.47 | 3.38 | 2.92 |
| Mahogany WRHU | MA-7 | 1.0 - 2.5 | 3.63 | 3.37 | 3.01 |
| Pine Mountain WRHU | MA-7, MA-9, MA-15 | 1.0 - 2.5 | 2.18 | 2.09 | 1.95 |
| Potholes WRHU | MA-7 | 1.0 - 2.5 | 4.04 | 3.99 | 3.87 |
| TePee Draw WRHU | MA-7 | 1.0 - 2.5 | 4.28 | 4.14 | 4.00 |
| Planning Area Average | | | 3.47 | 3.34 | 3.11 |

As the two tables illustrate, with the exception of the Pine Mountain WRHU, neither action alternative is successful at attaining the desired road density. This is of particular concern given the levels of hiding and thermal cover following the completion of planned activities. An additional concern that arises is the habituation of deer to motorized traffic and how that could increase their vulnerability to hunters or poachers using roads and trails. Alternative 3 results in a greater reduction in roads closed or decommissioned. Although densities do not meet the LRMP standard, the reduced densities would improve habitat effectiveness by reducing stress and movement of mule deer and thereby increasing the potential for survival.

**Alternative 1:** Alternative 1 would close or decommission no existing system roads. Under Alternative 1, current road and motorized trail densities, including both system and non-designated roads and trails, would remain at an average of 4.96 miles per square mile across the planning area with a range from 2.18 miles per square mile in the Pine Mountain WRHU to 7.90 miles per square mile in the Potholes WRHU. Average system road densities would remain at 3.46 miles per square mile and system motorized trails at 1.89 miles per square mile. The best available information regarding the number and mileage of non-designated roads and trails suggests that they would be 0.34 miles per square mile, a figure that is conservative. The motorized trail and non-designated trail densities are only reflective of those WRHUs or subunits that contain system trails or have identified non-designated routes within their boundaries.

During hunting season, a seasonal road closure (Green Dot system) reduces the mileage of both system roads and non-designated roads and trails to an average of 2.92 miles per square mile. All motorized travel, including OHVs, is restricted to designated routes identified by a green dot on road signs.

**Alternative 2:** Alternative 2 would close or decommission 19 miles of system roads. This would include the closing of 3.1 miles and decommissioning 15.6 miles. Under Alternative 2, average system road densities would decline to approximately 3.30 miles per square mile due to the closure and obliteration of system roads. This would also result in a decrease in the density of system roads and system trails to an average of approximately 4.77 miles per square mile (Table 3-18). No changes in the number of miles of non-designated roads and trails would occur because no area closures or other travel restrictions would be implemented. Non-designated roads and trails would remain and new ones would continue to be created.

**Alternative 3:** Alternative 3 would close or decommission approximately 42 miles of system roads including the closure of approximately 27.4 miles and the decommissioning of approximately 14.2 miles. Approximately 10 miles of system roads would be decommissioned by subsoiling; the remaining approximately four (4) miles are recommended for conversion to other uses, specifically for inclusion in a proposed designated class II OHV route on Pine Mountain. These four miles also provide access to range improvements and trend plots as well as to provide access for fire control and suppression activities. As such, these roads would continue to be utilized by agency personnel to monitor grazing activities and control wildfires and by the range permittee to provide access to improvements such as water sets and fences. Under Alternative 3, the closure or obliteration of roads would reduce system road densities to an average of approximately 3.11 miles per square mile. No system trails in the EFR trail system, including shared use and other roads designated as part of the trail system, would be closed. Non-designated roads and trails would remain and new ones would continue to be created. Road and motorized trail density associated with system roads and trails would drop to an average of approximately 4.6 miles per square mile.

Road densities would be further reduced under Alternative 3 to 2.5 miles by an additional seasonal closure from December 1$^{st}$ to March 31$^{st}$ of the following year. This closure would be imposed on

vegetation and fuel treatment areas upon completion of management activities and would serve to further mitigate the effects of the treatments on hiding and thermal cover.

Alternative 3 results in the greatest reduction in road and motorized trail density, because of the number of miles of system roads closed or obliterated and the application of a seasonal closure. As a result, it also provides the greatest potential reduction in habitat fragmentation, greatest increase in habitat effectiveness, greatest decreases in potential wildlife harassment, and greatest reductions in habitat damage or destruction. Alternative 2 does close or obliterate some system roads, the degree of reduction is only marginally better than exists under Alternative 1, which would close or obliterate no roads and implement no seasonal closure.

Much of the increase expected in habitat effectiveness and decreases in habitat fragmentation, harassment levels, and habitat damage or destruction is dependant upon the effectiveness in enforcing the prohibition on cross-country motorized travel. Current and projected staffing levels coupled with limited budgets suggest that enforcement is likely to be uneven and difficult. It is unlikely that the development of new non-designated roads and trails will be completely eliminated or controlled. Habitat fragmentation, habitat damage or destruction, harassment of wildlife, and habitat effectiveness are likely to continue to be adversely affected but below current levels. The rates of increase are also expected to be lower than current rates.

**Measurement Standard for: Acres closed to unrestricted cross-country motorized use**

**Alternative 1, 2 and 3:** Alternative 3 would limit use in the winter range habitat during the proposed seasonal closure from December 1 through March 31. With the exception of the seasonal closure proposed under Alternative 3 none of the alternatives would restrict motorized cross-country vehicle use anywhere in the planning area outside of the EFR OHV trail system area. Habitat would continue to be fragmented and harassment of wildlife such as sage grouse would continue and potentially increase with increasing activity. Resource impacts to sensitive soils, plants, and vegetation could potentially increase with increasing activity.

Use would continue on designated roads and trails including the use of non-street legal OHVs on level II roads. Cross-country motorized travel would continue to be prohibited within the EFR OHV trail system area under all alternatives.

**Cumulative Effects - Road and Motorized Trail Density –** There are no identified cumulative or cumulatively significant effects associated with the implementation of any of the three alternatives in combination with any of the current, on-going or reasonable and foreseeable actions. With the exception of the proposed designation of a Class II OHV route on Pine Mountain, none of those actions propose any new road or motorized trail construction nor do any of them propose the closure of any existing roads or motorized trails.

The proposed designated Class II OHV trail on Pine Mountain would use existing system roads and undesignated routes that currently exist and have been identified and included in the analysis of effects. There would be no measurable cumulative effect of this project under Alternative 1, 2 or 3. The proposed trail route would utilize approximately five (5) miles of existing system roads that are not closed under either alternative. The remaining approximately three (3) miles of the proposed route would utilize existing non-designated routes. As a result, there would be no change in either the roads only or road and motorized trail densities under those alternatives in the Pine Mountain WRHU. Road and road and motorized trail densities would remain below 2.5 miles per square mile under each alternative.

The proposed actions are also expected to comply with recommended guidelines that ensure adequate retention of coarse woody debris and surface organic matter following post harvest activities (Soils Report, page 42).

Under all alternatives, the combined effects of all past, present, and reasonably foreseeable management activities would be within allowable limits set by Regional direction and LRMP standards and guidelines for protecting and maintaining soil productivity within each of the proposed activity areas (Soils Report, page 42).

## Key Issue #2 – Condition of Existing Vegetation

Currently 10,645 acres, or approximately 29 percent of the forested acres, are rated at moderate to high for bark beetle risk. Of those acres 2,416 acres are rated as high for bark beetle risk because they have canopy closures of 35 percent or higher. The remaining 8,229 acres have a moderate risk rating with canopy closures ranging from 25 to 35 percent. Bark beetles are currently present and causing mortality in overstocked ponderosa pine stands near the Pine Mountain Observatory and the communication sites. Large diameter ponderosa pine in the Pine Mountain Old Growth Management area are showing signs of stress with many succumbing to stress and becoming susceptible to beetle attack. Many of the younger, black bark ponderosa pine stands in the Tepee Draw area in the western portion of the planning area have stocking levels that exceed upper management zone limits thereby making those stands at high risk for bark beetle outbreaks. Overstocked ponderosa pine stands in the Sand Springs area are also experiencing mortality associated with bark beetle activity.

- ***Measurement Standard:***
  - Number of acres treated that are rated as moderate to high risk for bark beetle attack.

**Existing Condition**

***Bark Beetle Risk–*** The planning area includes three major types; ponderosa pine, lodgepole pine dry shrub, and rangeland (including juniper and brush types) with 26,207, 10,444, and 17,974 acres respectively.

Historic conditions for the planning area were determined utilizing a timber atlas at the Bend-Fort Rock Ranger District that encompassed the period from 1913 to 1935. The information contained in the atlas covers approximately 62 percent of the planning area acreage and was utilized to identify historic timber types and age groups.

Some of the lands in the planning area were in the ownership of Brooks-Scanlon until a series of land exchanges with the Forest Service during the years of 1934 and 1939. Timber on those private lands was harvested prior to the exchange and was not included in the atlas.

Records dating from the time of the exchange indicate seed trees averaged two (2) per acre and that there were an additional five (5) trees per acres of pole-sized trees (3 to 12 inches dbh). Although covering less than two thirds of the planning area, it is the best information of historic conditions within the planning area available. It also appears to be consistent for the entire area. For these reasons, it is assumed that the atlas also approximates conditions present on the Brooks-Scanlon lands prior to harvest.

Table 3-21 displays the historic acreages and structural stages of the ponderosa and lodgepole timber types and compares them to current acreages of those types and structural stages that current exist within

the Opine planning area. The current type acres and percentages are based on the 1995 photo-interpretation layer in the district GIS database.

**Table 3-21 Historic and Current Timber Type Acreages and Structural Stages**

| PAG | Size Group | Structural Stage | Timber Atlas Acres | Timber Atlas Type Percent | Current Type Acres | Current Type Percent |
|---|---|---|---|---|---|---|
| Lodgepole Pine | Seedlings/Saplings | 0&1 | * | 0% | 1,082 | 10.4 |
| | Poles | 2&3 | 5,033 | 92.3 | 4,062 | 38.9 |
| | Mature | 4,5,6,7 | 418 | 7.7 | 5,300 | 50.7 |
| LP Totals | | | 5,451 | 100 | 10,444 | 100 |
| | | | | | | |
| Ponderosa Pine | Seedlings/Saplings | 0&1 | 858 | 4.3 | 7,009 | 26.7 |
| | Poles | 2&3 | 1,299 | 6.6 | 10,117 | 38.6 |
| | Immature (12-21") | 4&5 | 2,239 | 11.3 | 3,272 | 12.5 |
| | Mature | 6&7 | 15,391 | 77.8 | 5,807 | 22.2 |
| PP Totals | | | 19,787 | 100 | 26,205 | 100 |

During the past 30 years, approximately 5,250 acres or approximately 14.3 percent of the forested acres within the planning area have had one or more silvicultural treatments implemented. Of these acres, approximately 3,190 acres (approximately 60 percent of the previously treated acres) have had more than one entry. Of those 3,190 acres, 215 acres have had two commercial timber harvest entries; the remaining 2,975 acres have had a non-commercial silvicultural treatment such as precommercial thinning or reforestation activities implemented.

A total of 10,645 acres, approximately 29 percent of the forested acreage in the planning area, are rated as being at moderate to high risk for bark beetle attack because they have canopy closures of 25 percent or greater.

**Effects**

***Bark Beetle Risk***

**Alternative 1**: Under Alternative 1, none of the acres rated as moderate to high risk for bark beetle attack 10,645 acres, would have stand densities reduced. The likelihood of a landscape level bark beetle epidemic is highest under this alternative. No measurable change in the number of acres at risk would be expected during the next 5 to 10 years. It poses the greatest risk of loss of habitat for species that require more dense stands and higher canopy closure levels, especially over the long-term. Assuming no disturbance from wildfire or insect attack in the long-term, the number of acres rated as moderate to high risk would be expected to increase as stands currently rated as low risk due to low stand densities and canopy closure levels, experience increases in density levels and canopy cover. In stands comprised of large diameter, older aged trees overtopping dense understory, the increasing stress associated with the increasing competition for space, nutrients, and water would result in continued and increasing mortality of the larger overstory trees. Structural diversity would be reduced or lost. The presence of dense stands would also continue horizontal fuel continuities, which when combined with continued vertical fuels, would retain the high risk of a high intensity ground and/or crown fire and result in increasing the risk of damage or destruction to existing and proposed new facilities and site improvements.

**Alternatives 2 and 3:** Both reduce the risk of a landscape scale bark beetle epidemic. Alternative 2 and 3 would treat 43 percent (4,625 acres) and 47 percent (4,964 acres) respectively of the 10,645 forested acres currently rated as moderate or high risk of bark beetle attack. Post-treatment stocking levels under both alternatives are expected to keep beetle risk levels in treated stands at low to moderate levels for 20 to 30 years before re-entry would be required to again reduce canopy coverage to achieve low to moderate risk levels. In stands with large diameter or mature and old growth aged trees, reduced stocking levels would reduce the competition for available resources resulting in reduced stress levels, increased vigor, and

reduce risk of attack by beetles. Both also reduce the quality, quantity, and distribution of habitat for species dependant on higher stand densities and canopy closure levels, especially in the short-term. In the long-term, both would result in greater stability and distribution of habitat that is more reflective of the biological capacity of the area with habitats less likely to be disrupted by uncharacteristic events such as uncharacteristic wildfire or insect epidemics.

**Alternative 2:** Fifty-seven (57) percent (6,020 acres) of the moderate or high risk rated acres would remain untreated under Alternative 2. Effects of not treating these stands would be the same as described under Alternative 1.

**Alternative 3:** Fifty-three (53) percent (5,681 acres) of the moderate or high risk rated acres would remain untreated under Alternative 3. Effects of not treating these stands would be the same as described under Alternative 1. The risk of loss of existing thermal cover, particularly optimal thermal cover, is greater under Alternative 3 because no existing optimal thermal cover (stands meeting the LRMP definition of thermal cover with 40 percent or more canopy closure) acres would be thinned to reduce stocking and canopy closure levels and thereby reduce the risk of bark beetle attack. In the event of such an attack, the loss of optimal thermal cover is likely to be much greater and spread across more acres than would occur under Alternative 2, which thins much of the existing optimal thermal cover.

**Cumulative Effects –** There are no identified cumulative or cumulatively significant effects associated with any of the current, on-going, or reasonably foreseeable actions in conjunction with any of the three alternatives in this analysis. None of the other current, on-going or reasonable and foreseeable actions would have any measurable cumulative effects on bark beetle risk in conjunction with any of the three alternatives. None of the activities or actions would result in changes to existing condition (Alternative 1).

For Silvicultural/Vegetation Effects (thinning) related to Fire/Fuels (see Key Issue #3 Wildfire Risk below).

## Key Issue #3 - Wildfire Risk

Increasing forest stand and shrub community densities are contributing to an increased risk of high or extreme fire behavior potential due to increases in fuel loadings and the development of ladder fuels. Currently, 34 percent (18,491 acres) of the planning area is classified as either high (3,463 acres/six (6) percent) or extreme (15,028 acres/28 percent) for wildfire behavior potential.

Fire exclusion (fire suppression), lack of hazardous fuel treatment, and development of denser forest stands have increased fuel loadings above historic conditions. Fire starts historically in the project area have been lightning and human caused. With the rise in population growth in Central Oregon the risk of fire sta.rts from high public use are predicted to increase. The combination of higher fuel loadings and increased risk of fire starts creates the potential for high intensity, stand replacing fire behavior. Should a fire start, go undetected and a wildfire occur, forest health, wildlife habitat, soils, water quality, recreational values and the safety of public and fire fighters could be significantly affected.

- ***Measurement Standard:***
  - Number of acres treated that are rated as moderate to extreme fire behavior potential

**Existing Conditions**

The Opine planning area has experienced a number of large fires within the past 60 years. The Deschutes National Forest defines a large fire as one that is 100 acres or greater in size. Since 1945, approximately 6,370 acres (11.7 percent of the planning area) have burned within the planning area with the average fire

size being approximately 579 acres. A total of 23 fires, totaling approximately 29,400 acres have occurred in the planning area since 1911 with eight (8) of those fires, totaling approximately 2,000 acres, having occurred during the past 30 years (Silviculture Report).

The large fire activity during this period has occurred predominately in the mid and high elevations of Pine Mountain (Pine Mountain 1968, Pine Mountain 1977, Dead Wilma 1977). Historic Mean Fire Return Intervals ranged from approximately 10 to 100 or more years in high elevation sites to approximately 10 to 75 years in mid-elevation sites. This is in contrast to recent research on Pine Mountain that found the average return interval to be approximately 14.25 years prior to 1870 and that the return interval increased to 43.15 years after 1870. This increase in the return interval has been attributed to fire suppression activities initiated in the early 1900s (Fire/Fuels and Air Quality Report).

Initiation of fire suppression in the early 20th century allowed for naturally occurring fuels to increase in lower and mid elevation areas to levels above those found historically. Ladder fuels – shrubs, low branches, and small diameter trees – have increase in both numbers and distribution. Horizontal fuels are more continuous and trees have increased in both height and density. On Pine Mountain, the majority of the pine stands contain large diameter trees with a dense understory of sapling, pole size or "blackbark" trees. In the Tepee Draw area, much of the area is open with clumps of trees dominated by large ponderosa pines. Large contiguous areas of dense, highly flammable shrubs such as bitterbrush and sagebrush have developed here. These shrub areas have potential for flame lengths of up to 20 to 30 feet as observed on the Skeleton fire (1996), increasing the potential of crowning, spotting and major fire runs. These conditions do not permit fires to burn with the lower intensities common to earlier fire events, but rather they burn with higher intensities resulting in the increased mortality in both forested and xeric shrub communities. A similar condition has also occurred in upper elevation sites with similar results.

Lightning is the leading cause of fires in the planning area. Since 1992, there have been 45 known fire occurrences of which 31 (69 percent) were the result of lightning strikes. Typically, lightning storms track from the south and southwest in contrast to the prevailing winds which typically track from the west and northwest during the period of April through September.

Of the 45 known fires since 1992, 14 (31 percent) were human caused. This number is projected to increase. Roads 18, 23, 25, 2510 and 2017 experience increasing levels of use during summer and fall. Other primary and secondary roads within the planning area are also experiencing increasing use. There are numerous dispersed campsites which have been active over the years. These areas were historically utilized by hunters but increasingly are utilized by dispersed campers including OHV enthusiasts.

In ponderosa pine stands, underburning is the only economical method at this time to remove the needles, limb case and bark slough that accumulates at the base of the trees.

Most areas within the planning area have roads that provide access for fire suppression activity. Fuel conditions adjacent to most roads, including major access routes such as Roads 18, 2017, 23, 25, and 2510; do not provide defensible space for suppression forces during high intensity wildfire events. Primary and secondary roads do not provide safe escape routes for either suppression forces or the public.

**Desired Condition -** From a fuels management perspective, the landscape within the planning area should display a mosaic of strategically placed areas that are managed to achieve the following goals:

- reduce fire behavior potential;
- aide in the suppression of wildland fire (i.e. defensible space); and
- provide protection to valuable resources and especially improvements located on Pine Mountain and at Sand Springs (Fire/Fuels and Air Quality Report).

Areas managed for reduced fire behavior potential would include a number of associated desired conditions.

1) Surface fuels, shrubs, would be maintained in a mosaic pattern that would reduce the rate of spread and crown fire initiation.
2) Shrub cover would also be maintained at a height that would keep flame lengths under four feet so that any fire starts could be attacked at the head or flanks by firefighters using hand tools.
3) Ladder fuels would be reduced so that in the event of a fire, crown fire initiation would not be sustained across the landscape.
4) Within the strategic areas on the landscape, fuel model 8 and 9 would characterize conditions conducive to low fire behavior where fire starts would be more easily attacked by ground forces.
5) Safe and quick ingress and egress for firefighters and egress for the public would be provided on major travel routes. Safety corridors would also provide firefighters conditions to safely attack and suppress wildfires.
6) Major improvements, including but not limited to the observatory, microwave sites, and Sand Springs substation and transmission lines; would be located in a landscape where protection efforts are facilitated by vegetative conditions more representative of historic fire and fuel conditions.

To meet these future conditions, five fuel reduction strategies are proposed:

1) defensible space / fuel break-safety corridors:
2) large treatment blocks;
3) restoration of historic fire regimes in ponderosa pine ecosystems;
4) activity fuel reduction /discontinuous ground fuels; and
5) thinning to reduce crown fire susceptibility and long range spotting.

**Fire Behavior Fuel Models -** Fuel models are used to predict how fires would behave given specific environmental and physical site conditions.

Fuel conditions vary over the analysis area. The planning area includes xeric shrublands (33 percent of the planning area); shrub fields with patches of multiple age ponderosa pine (48 percent of the planning area); and ponderosa pine and lodgepole pine mixed stands with multiple age classes and an understory shrub component (19 percent of the planning area) (Fire/Fuels and Air Quality Report). These vegetation types contain six (6) fuel models which help to identify fire behavior potential. Table 3-22 displays the fuel models present, the acreage associated with each, and the fire behavior potential exhibited by each model.

**Table 3-22 Acreage by Fuel Model and Fire Behavior Potential**

| Fuel Model | Acres | Percent of Area | Fire Behavior Potential[46] |
|---|---|---|---|
| 2 - short grasses in open pine stands | 23,795 | 44% | Moderate |
| 5 - young or low green shrubs | 6,242 | 11% | Low |
| 6 - dormant shrubs | 15,028 | 27% | Extreme |
| 8 - compact conifer litter layer with little to no undergrowth | 340 | 1% | Low |
| 9 - long-needle litter | 3,956 | 7% | Moderate |
| 10 - dead down woody fuels | 3,463 | 6% | High |
| Non-veg | 1,683 | 4% | None |

[46] Fire behavior potential based on surface fire potential flame, length, rate of spread and fire line intensity using the BEHAVE fire spread model.

Fuel models 2, 5, and 6 are the predominate models in the planning area. Fuel models 8, 9, and 10 are present. The slash fuel models - 11, 12, and 13 (light, medium, and heavy slash respectively) - are not present due to treatments in previously harvested areas. Fuel models 1, 3, 4, and 7 do not exist in the planning area.

Fuel models 6 and 10 are rated as high or extreme for fire behavior potential. Collectively they encompass 33 percent of the planning area or approximately 18,491 acres. Fuel models 2 and 9, rated moderate for fire behavior potential encompass 51 percent of the planning area or approximately 27,751 acres. These four fuel models collectively include 84 percent of the planning area acres or 46,242 acres.

A typical fire season on the Bend-Fort Rock Ranger District is defined as from May 15th through September 30th. The analysis of the effects of a fire burning under the three alternatives is based on 90th percentile day[47] weather conditions. The 90th percentile day weather conditions are based on observations obtained from a weather station located within northwest corner of the planning area, located within the planning area boundary. Based on observations from that station, the following conditions are considered to be representative of weather for the planning area on the 90th percentile day:

- air temperature of 90 degrees Fahrenheit;
- relative humidity of 13 percent;
- wind speeds of 12 miles per hour measured 20 feet above the tallest vegetation;
- 1-hour fuel moistures of 3.4 percent;
- 10-hour fuel moistures of 4.9 percent;
- 100-hour fuel moistures of 10.8 percent;
- live herbaceous fuel moistures of 50 percent; and
- live woody fuel moistures of 60.7 percent.

The above information/assumptions were used to model expected fire behavior in the planning area using the BEHAVE program. Models 2 and 6, representative of the ponderosa pine/grass understory and xeric shrub habitats respectively, were used to model the existing condition as they represent approximately 71 percent of the planning area acres. Model 9, which represents stands of ponderosa pine characteristic of conditions found at the time of Euro-American settlement, was run to represent the desired conditions, both in terms of vegetation and expected fire behavior.

Table 3-23 displays the results of the BEHAVE model runs for the Opine planning area.

**Table 3-23 Selected Fire Behavior Conditions**

| Fuel Model | Flame Length (feet) | Rate of Spread (maximum) ch/h |
|---|---|---|
| Fuel Model 6 | 6.8 feet | 36 chains per hour |
| Fuel Model 9 | 3.2 feet | 9 chains per hour |
| Fuel Model 2 | 7.0 feet | 38 chains per hour |

Under conditions of the 90th percentile day, flame lengths can range from three (3) to 7 feet. When flame lengths exceed four (4) feet in length, fires are too intense for direct attack and require mechanized equipment and/or retardant drops for effective control. Based on observations from the Skeleton fire we may expect even higher flame lengths.

[47] During a typical fire season, 90 percent of days have weather conditions that are cooler, have higher relative humidities, and lower wind speeds than the 90 percentile day. The remaining 10 percent of the days are warmer, have lower relative humidities, and higher wind speeds.

Defensible space is created by reducing crown densities and reducing the quantity and distribution of ground and ladder fuels which result in less intense wildfires that allow for a greater potential of control. Effective fuel breaks-safety corridors remove fuels from an area 600 to700 feet on the windward side of roads and 500 to 600 feet on the leeward side of roads. Such actions also reduce the intensity of a fire, allowing for a greater potential for control as well as providing a greater degree of safety for firefighters and the public for ingress and egress.

Large treatment blocks reduce the potential of a wildfire event moving around treated areas or spot beyond it during periods of moderate to extreme fire conditions. Large blocks also help to slow the spread of a fire and provide firefighters time to get into the area and fight the fire safely.

As noted previously, fire return intervals throughout much of the planning area were relatively short and resulted in relatively low intensity fires. Fuel loadings were maintained at relatively low levels and the accumulation and development of both lateral and vertical (ladder) fuels were minimized.

Treatment of natural fuels does not insure total protection of important improvements or resources. Experience has shown thinning and prescribed fire each target different components of the fuel bed of a given forest stand and landscape. Suppression options are increased and more highly effective where fuel treatments have occurred (Fire/Fuels and Air Quality Report).

Activity fuels are fuel materials created by management activities such as timber harvest, brush control, facility development and other similar types of actions. Reducing the amount and distribution (fragmentation) of such additional fuel material increases the likelihood that should a wildfire be initiated, control would be easier and safer for firefighters. Fragmentation in natural fuels serves a similar purpose. Fragmentation of activity and natural fuels can and often does occur simultaneously within treatment units.

Dense stands of trees support independent crown fires. Thinning increases the distance between crowns and reduces the risk of a crown fire. Thinning also reduces torching and crowning that can occur with ground fires.

Although application of any one of these strategies may be successful in localized areas, current conditions across much of the planning area necessitate the implementation of two or more of these strategies in combination to best address both the existing condition and to meet the objectives for both the land allocation and for fuel reductions.

**Effects*:*** Experience in similar vegetation types and conditions on the Bend-Fort Rock Ranger District has shown that the effectiveness of fuel reduction treatments, specifically mowing and prescribe fire, generally last a period of time ranging from approximately seven (7) to 15 years depending on the site, intensity of treatment, etc. For the purposes of the analysis and discussion, short-term effects are defined as those which occur within that seven (7) to 15 year effectiveness window associated with those treatments. Long-term effects are those that occur or continue to occur beyond that period.

**Fire Behavior Potential** - Table 3-24 displays the change in the number of acres by fire behavior potential following proposed treatments under each alternative.

**Table 3-24 Changes in Fire Behavior Potential Following Vegetation and Fuel Reduction Treatment**

| Fire Behavior Potential | Existing Condition Acres | Alt 1 – No Action | | Alt 2 – Proposed Action | | Alt 3 | |
|---|---|---|---|---|---|---|---|
| | | Treatment Acres | Untreated Acres | Treatment Acres | Untreated Acres | Treatment Acres | Untreated Acres |
| Extreme / High | 11,547 | 0 | 11,547 | 11,147converted to moderate or low | 400 (converted from extreme to high) | 9,052converted to moderate/ low | 2,495 |
| Moderate | 4,112 | 0 | 4,112 | 4,076 converted to low or remain the same | 36 | 2,794 converted to low or remain the same | 1,318 |
| Low | 11 | 0 | 11 | 11 (maintenance) | 0 | 0 | 11 |

Under Alternative 2, 11,147 acres of treated extreme / high were converted to 5,122 acres of moderate and 6,025 acres to low. Under Alternative 3, 9,052 acres of treated extreme / high were converted to 5,575 acres of moderate and 3,477 acres of low.

Within the planning area and outside of treatment units there is an additional 6,222 acres rated as high/extreme for fire behavior potential bounded by Road 23, the planning area boundary, and Roads 2510 on the west and 2310 on the east. No treatments are proposed in this area under either alternative. The area is characterized by forested lavas, discontinuous fuel loadings, and poor road access. Despite having a high or extreme fire behavior potential rating, the relatively discontinuous character of the fuel bed, both vertical and horizontal, coupled with a landscape broken by lava outcroppings makes this area a relatively low risk for an uncharacteristic wildfire event. As a result, this is a low priority for treatment.

Table 3-25 displays by alternative and treatment unit, the expected change in fire behavior potential within each treatment unit, both vegetation and fuel reduction. Vegetation units located within the boundaries of the larger fuel reduction unit (identified in parenthesizes after the fuel treatment unit) are included with the fuel reduction unit in the Alternative 2 acreage figure, but not in the Alternative 3 figure. Under Alternative 3, the included vegetation units are adjacent to or located within the boundaries of the adjacent or surrounding fuel treatment unit. Under both alternatives, the proposed treatments in the vegetation treatment units also contribute to the resulting change in fire behavior potential.

**Table 3-25 Post-Treatment Acreage Changes in Fire Behavior Potential by Alternative**

| Fuel Treatment Unit No. (Assoc. Veg Treatment Unit No. (Alt 2/Alt 3)) | Post Treatment Fire Behavior Potential | | |
|---|---|---|---|
| | Alternative 1 | Alternative 2 | Alternative 3 |
| F01 (P02, P03, H02-04 / P302-305, C302, C303) | High | Low | Low |
| F02 (0 / NA) | Mod-Extreme | Low | NA |
| F03 (0 / 0) | Moderate | Low | Moderate |
| F04 (P01, H01, H02 / P301, C301, C302) | Mod-Extreme | Moderate | Moderate |
| F05 (P15, H15 / P333 / C326) | Mod-Extreme | Moderate | High |
| F06 (0 / P312. C339) | Extreme | Low | Low |
| F07 (0 / NA) | Mod-Extreme | Moderate | NA |
| F08 (0 / NA) | Mod-Extreme | Moderate | Moderate |
| F09 (SD02, SD08, P05-07, H08, H09 / P307-310, P315, P316, P324, P346, C308, C339) | Mod-Extreme | Moderate-High | Moderate-High |
| F10 (0 / NA) | Low | Low | NA |
| F11 (P10, P11, H11 / P317, P320, C307, C339) | High | Moderate | Moderate |
| F12 (0 / NA) | Low-Moderate | Low | NA |
| F13 (P17, H14 / P334, P339) | Mod-Extreme | Low | Moderate |

| Fuel Treatment Unit No. (Assoc. Veg Treatment Unit No. (Alt 2/Alt 3)) | Post Treatment Fire Behavior Potential | | |
|---|---|---|---|
| | Alternative 1 | Alternative 2 | Alternative 3 |
| F14 (SD04, P13, P14, P15, P19, H24, H27 / P328, P329, P331, P333, P338, C320, C324, C325) | Extreme | Moderate | Moderate |
| F15 (SD08, P14, P15, H12, H13 / P331-333, C309, C310) | Extreme | Moderate | Moderate |
| F16 (P08, H10, H11 / P316, P321, C307) | Mod-Extreme | Moderate | Moderate |
| F17 (SD08, P07 / P315, P316, P320, P321, C307, C339) | Mod-Extreme | Moderate | Moderate |
| F18 (SD08 / P314, C308) | Mod-Extreme | Moderate | Moderate |
| F19 | Mod-Extreme | Moderate | Moderate |
| F20 (SD07, P15, P16, H16-25 / P333, P335-337, C311-321, C328) | Mod-Extreme | Low | Low |
| F21 (P18, H27 / P338, P339, C325) | Mod-Extreme | Low | Moderate |
| F22 (H42 / P322) | High | Low | NA |
| F23 (P19, H22, H24, H26 / C320, C322-324) | Extreme | Low | Low |
| F24 (H22 / C322) | Extreme | Low | Moderate-High |
| F25 (0 / NA) | High-Extreme | High-Extreme | NA |
| F26 (0 / NA) | Low-Moderate | Low-Moderate | NA |
| F27 (0 / 0) | Moderate | Moderate | Moderate |
| F28 (H28 / C327) | Extreme | Low | High |
| F29 (0 / 0) | Low-Extreme | Low | Moderate |
| F30 (-- / C331) | Low-Moderate | Low | NA |
| F31 (H34, H35 / C331, C333) | Moderate | Low | Low |
| F32 (H38-41 / C336, C337) | Low-Moderate | Low | Low |
| F33 (SD04 / P328) | Mod-Extreme | Moderate | Moderate |
| F34 (P12 / P13 / P329) | Mod-Extreme | Low | High |
| F35 (P06, P08, H09-11 / P311, P312, P315, P316, P346, C305, C339) | Mod-Extreme | Low | Low |
| F36 (P06, H06, H07 / P311, P305, C339) | Extreme | Moderate | Moderate |
| F37 (0 / P305, P325) | Low-Moderate | Low | Low-Moderate |
| F38 (SD01, P04, P05, H0305, H08 / P303-307, P323, C304, C305) | Mod-Extreme | Moderate | Moderate |
| F39 (0 / P312) | Mod-Extreme | Moderate | Moderate |
| F40 (SD04, SD05, H12 / P328, P330, C309) | Extreme | Moderate | Moderate |
| F41(P13 / P328, P329) | Mod-Extreme | Moderate | Moderate |
| F46 | Low-Moderate | NA | Low |
| R1A, R1B, R2A, R2B, R3A East, R3A West | Moderate | Low | Low |

**Alternative 1** would result in no change in the number of acres in the high to extreme fire behavior potential. Both action alternatives decrease the number of acres rated as high to extreme for fire behavior potential. Treated acres under both action alternatives would move to moderate or low fire behavior potential result in reduced fire severity, low risk, easier control, and better protection for improvements, other resource values, the public, and firefighters.

Under Alternative 1, there would be no change in fire behavior potential; approximately 85 percent of the planning area acres would remain at moderate to extreme/high fire behavior potential. Based on the BEHAVE runs, flame lengths would be expected to be at least 6.8 to seven (7) feet in length with rates of spread of 36 to 38 chains per hour (approximately 0.5 miles per hours). This makes control more difficult. Direct attack using hand crews is difficult or impossible; control usually requires use of retardant and/or mechanized equipment such as dozers.

More acres would transition towards increased fuel loading under this alternative. This would result in increased fire intensities and rates of spread. Fuels reduction would only occur during wildfires.

All forested acres would remain at risk for a stand replacing fire. Fire intensities would be higher than historic fires due to the additional fuel buildup resulting from fire suppression. Fuels (i.e. tree needle and limb cast, bark slough, ground vegetation, overstocked stands and dead trees) would continue to

accumulate. These accumulations can result in morality of trees that would usually not be killed by low to moderate intensity fire events. The buildup at the base of trees can result in fire starts that burn with such intensity that root systems are damaged and the tree cambium destroyed thus killing the tree.

Nearly all existing old growth stands contain continuous vertical fuels; wildfires in such stands would result in crown fires and subsequent mortality. The height from the ground to the base of the live crown would remain between five (5) and 31 feet. This would maintain the risk of a surface fire climbing into the canopy and becoming a crown fire. Tree crowns would also be closer together allowing a crown fire to spread more easily at lower wind speeds. Crown fires would also increase mortality levels.

In mixed pine stands (lodgepole and ponderosa), similar fuel accumulations and conditions would continue to exist. Dense lodgepole pine regeneration would continue to create undesirable stand densities (ladder fuels) that pose continuing and increasing risks to the survival of the larger ponderosa pine during a wildfire event.

The effects of uncharacteristic wildfire on forest health, wildlife habitat, soils, water quality and recreational values and as well as the safety of firefighters and the public, would continue to increase. No safety corridors would be established along Roads 18, 2017, 23, 25, or 2510. Fuels would continue to accumulate adjacent to or near high use/value special use developments and recreational use areas such as the Pine Mountain Observatory, the BPA Sand Springs compensation station, and the EFR OHV trail system.

The risk of wildfire with the potential for loss of critical mule deer winter forage and both hiding and thermal cover would remain high and increase over time under this alternative. It would forgo the opportunity to reduce the risk of wildfire occurring in big game hiding and thermal cover which is at high risk of loss in the event of wildfire. Additionally, uncharacteristic wildfire would also likely result in habitat losses within OGMA areas as well as the loss of wildlife habitat associated with old growth ponderosa pine.

Continued transition to an infrequent and intense fire regime would occur in fire dependent ecosystems that historically experienced frequent, low intensity fire events. In these areas, fire starts that escape initial suppression action would cycle a high portion of the landscape to an early seral stage. This includes most of the planning area except areas dominated by lodgepole pine.

No natural fuel reduction activities would be implemented under Alternative 1 and the risk to important resources and resource values would continue and would increase over time with increasing fuel loadings. Suppression actions would continue to be hazardous for firefighters. Suppression options would be eliminated due to lack of escape routes and safety zones. Fireline intensity would prevent direct attack with ground forces. The effectiveness of aerial delivered retardants would be limited due to long range spotting. Dozer rather than hand line construction would be necessary due to fire intensity. Public safety would be compromised due to limited evacuation routes.

The increased risk and probability of a high intensity, uncharacteristic wildfire associated with increasing fuel loadings would result in the increasing likelihood of the complete lost of understory and overstory vegetation. Large contiguous areas of dense shrubs, needle cast and grasses have developed in the absence of the low intensity wildfire historically characteristic of the planning area. These highly flammable shrubs have the potential for flame lengths of up to 20 to 30 feet. With existing shrub conditions, the potential exists for fire spread into the canopy of trees allowing for high intensity, stand replacement crown fire. Although past fuel treatments (i.e. mechanical shrub treatments, mowing, and prescribed fire) have occurred in the planning area, large contiguous areas of dense shrubs remain.

Human caused fire starts would persist in the area although district fire prevention would strive to reduce human caused fires.

Six (6) bitterbrush monitoring study plots would remain at risk from wildfire under this alternative. Ongoing, related monitoring would be lost which would be costly in both dollars invested and knowledge gained with further monitoring.

**Alternative 2:** Fuel reduction treatments following vegetation treatments overlap on approximately 5,312 acres. Fuel reduction treatments on these acres would target understory vegetation, primarily shrubs and trees four (4) inches dbh and smaller, remaining after timber harvest and activity slash treatment actions are completed. Treatments include either underburning or burning beneath the dripline of residual overstory trees.

**Alternative 3:** There is no subsequent fuel reduction treatment that overlaps with proposed vegetation treatment units. There would be no measurable difference in fuel loadings between the two alternatives following completion of prescribed management activities.

**Alternatives 2 and 3:** Under Alternatives 2 and 3, the BEHAVE program predicts a flame length of 3.2 feet with a rate of spread of approximately nine (9) chains per hour ((approximately 0.1 mile per hour). This behavior allows for the safe and efficient use of hand crews to control a fire event and reduces the need for retardant and/or mechanized equipment.

Alternatives 2 and 3 would reduce the acreage rated as being high or extreme fire behavior potential by 93 and 94 percent respectively after all vegetation and fuel reduction treatments are completed. Alternative 3 targets fuel reduction treatments on fewer acres than on Alternative 2, but a higher percentage of the treated acres are rated as having high to extreme fire behavior potential than Alternative 2.

Alternatives 2 and 3 would result in a decrease in the number of acres rated as high to extreme for fire behavior potential. Within the treatment areas there is an estimated 11,547 acres (Table 3-24) rated as extreme to high fire behavior potential. Alternative 2 treats approximately 11,147 acres. Alternative 3 treats approximately 9,052 acres.

Fuel reduction treatments, including both vegetation and fuel units, target areas that are characterized by high levels of vertical and horizontal fuels and high stand densities. The Tepee Draw, Pine Mountain, and Sand Springs areas are rated as high to extreme for fire behavior potential.

Under both action alternatives, fuel reduction treatments would include a range of actions including: underburning, hand and machine piling of slash, pile burning, and mechanical shrub treatment (mowing). Within harvest units, the reduction of activity fuels (slash) excess to wildlife and soils needs and requirements would include the utilization of dead standing and down trees or slash piles, tree thinning, whole-tree-yarding, and the burning of piles.

Mechanical shrub treatments, ladder fuels reduction and prescribe fire would be used to begin restoring the role of fire in the ponderosa pine ecosystems. Within treated areas, the intensity of wildfire under extreme conditions would be reduced and provide suppression forces a greater opportunity to control a wildfire before nearing improvements or compromising the safety of visitors. The proposed treatments would fragment continuous ground fuels and aerial fuels and move many acres to low or moderate fire behavior. Unfortunately, as vegetation grows back, these treatments are likely to become less effective in 5 to 10 years and ineffective in 10 to 20 years in some areas.

## Silvicultural/Vegetation Effects (thinning) related to Fire/Fuels

These proposed treatment (thinning) will reduce the risk and potential of a crown fire by increasing the distance between residual trees. Stands under both action alternatives would be thinned from below. The distance from the ground to the base of the live crown would increase and average from 20 to 30 feet, depending on residual tree size (Silviculture Report, page 20). By increasing the height to the live crown, the thinning also breaks up vertical fuel continuity (ladder fuels) and reduces the risk of a surface fire climbing into the canopy. Thinning from below would also increase the distance between tree crowns thereby reducing the risk of a crown fire by requiring higher wind speeds to allow the fire to climb into the canopy and to spread the fire between trees. Mortality rates would be expected to decline and the number of mature and old growth aged trees lost to fire would decline.

Thinning through the application of prescribed fire and mowing also serves to reduce the quantity and distribution of understory shrub vegetation. It also serves to reduce the quantity and distribution of needle cast captured by understory vegetation. This also helps to reduce ladder fuels and the risk and potential for a crown fire developing from a ground fire.

Thinning in the overstory tree component would also increase light levels and nutrient availability to understory vegetation. When combined with thinning in understory vegetation, which also reduces understory densities, thinning also increases the amount of space available for the initiation of new vegetation. This increase in understory vegetation would begin the process to restore understory ladder fuel levels and distribution to pretreatment levels in the five (5) to 15 years following treatment.

In the short-term, 3 to 5 years or so, thinning also reduces competition and increases the availability of nutrients, space, and light for residual vegetation. That vegetation responds with increased growth. In the long-term, this increase in resources also provides opportunities for new vegetation to become established. Both result in new increases in the amount and distribution of both horizontal and vertical (ladder) fuels. Such ingrowth, plus the expansion of residual tree crowns into the newly opened space, would be expected to require retreatment within one to two decades depending upon post-harvest spacing and growth to return these stands to a low fire behavior potential level.

The primary differences between the two alternatives are: 1) there would be fewer entries to accomplish the objectives under Alternative 3; and 2) pretreatment activities prescribed under Alternative 2 would eliminate all trees four (4) inches dbh and smaller whereas Alternative 3 would pretreat fewer acres through all diameter classes and retain individuals trees four inches dbh and smaller.

**All Alternatives:**
The risk and threat of a wildfire threatening improvements would remain high across the planning area under Alternative 1. No fuel reduction or vegetation treatments would be initiated that would reduce fuel loading or increase the probability of suppressing a fire before reaching major improvements or facilities such as the observatory, electronic sites, or the BPA substation and transmission lines. Flame lengths and rates of spread would remain high, increasing the difficulty in controlling the fire. Improvements associated with other resource uses including OHV facilities, other recreation sites, and grazing improvements such as fences, water troughs, and analysis plots would also remain at risk.

Both action alternatives would reduce the risk of a wildfire threatening improvements at Pine Mountain (specifically the observatory and electronic sites). This would be accomplished by breaking up fuel continuities, reducing fuel loadings, and reducing the risk of spot fires. Control using hand crews would be easier due to decreased flame lengths and rates of spread. Under Alternative 2, units F03, F08, F19, and F25-27 would reduce the risk of a wildfire spreading from the Pothole flats area on the southwest side of Pine Mountain up the slopes towards the observatory and the electronic site just west of the

observatory. There are no proposed vegetation treatment units in this area that would provide additional protection. Units F01, F04, F06, F07, F09-F11, F16-18, and F36-F39 would perform a similar function on the north side of Pine Mountain and would also help to protect the Antelope electronic site at the eastern end of Pine Mountain. The adjacent vegetation units would also contribute to this protection. These same units also function to protect old growth habitat (including existing old growth ponderosa pine) on Pine Mountain by reducing the risk of an uncharacteristic wildfire (Fire/Fuels and Air Quality Report).

Additional protection would also be attained, at least indirectly, by improving safety and access for firefighters. Units along Roads 23 and 2017, including but not limited to F08, F19, F27, F36, and F39 would result in reduced fuel loadings adjacent to these roads making it easier for firefighters to quickly and safely attack a wildfire. The reduced fuel loadings would reduce flame lengths and rates of spread.

Under Alternative 3, units F03, F08, F19, and F27 would be treated and would provide protection to the observatory and electronic site from a fire spreading for the Pothole flats area to Pine Mountain. In contrast to Alternative 2, units F08, F19, and F27 would average 200 feet wide on either side of Road 23 in contrast to the 150 foot distance under Alternative 2. Also in contrast to Alternative 2, in units F08 and F19, the area between the road and the boundary with Unit F03 would be treated using prescribe fire which would be ignited from within unit F03 and allowed to creep toward the road. Mowing would only be applied in this area in both units only when and where the use of fire did not meet fuel reduction objectives. The east side (Pine Mountain side) of the road would be mowed only. This increase in unit width would provide additional safety for firefighters although it would still be less than the desired width of 600 to 700 feet. On the north side of Pine Mountain, units F04, F11, F38, F36, F01, F06, F09, F17, and F39 and adjacent vegetation units would help to protect the observatory and both electronic sites. These same units also function to protect old growth habitat (including existing old growth ponderosa pine) on Pine Mountain by reducing the risk of an uncharacteristic wildfire (Fire/Fuels and Air Quality Report).

Unit F46 is only proposed for treatment under Alternative 3. It is a plantation in which understory vegetation is creating ladder fuels that threaten to damage or destroy the plantation should a wildfire occur. Mowing would reduce the understory vegetation to an average height of six (6) to eight (8) inches thereby reducing current and future ladder fuels and reducing the risk of a wildfire becoming a crown fire and damaging or destroying this plantation.

**All Alternatives (long-term):** In 10 years or longer, the potential for future uncharacteristic wildland fire within the planning area would remain under all alternatives. The greatest potential would remain under Alternative 1, which does not provide any opportunities to reduce existing forest fuels and the hazard they pose in the future on wildland fires. Under Alternatives 2 and 3, although the potential would remain, the size and location of an uncharacteristic wildfire would be limited and the likelihood of control would be greatly enhanced.

Ecosystem restoration/maintenance under Alternative 2, units F12, F24, and F32, prescribe fire would be utilized to return fire to a ponderosa pine ecosystem. Under Alternative 3, only Unit F18 would be treated to meet this goal. No other fuel reduction activities would be prescribed in these units. During initial treatment operations, longer flame lengths, greater residual tree mortality, and increased smoke emissions would be expected due to the existing high fuel loadings. Subsequently, treated areas would be expected to result in shorter flame lengths, reduced residual tree mortality, and fewer smoke emissions due to lower fuel loadings resulting from the initial treatment. It is expected that return to pretreatment fuel conditions (fuel model) would take 30 or more years although continued growth and development of vegetation would continue to result in slow increases in fuel loadings thereby also resulting in increases in flame lengths, smoke emissions, and fire intensities should a fire event be initiated.

Units F02 (Alternative 2), F05, F13, and F21 (Alternatives 2 and 3) have all been previously treated in the past 10 to 12 years. The intent is to maintain these areas in a condition class within or near a historical range for the next 7 to 15 years.

**Cumulative Effects -** Treatment activities prescribed and/or implemented in the Fuzzy planning area to the west would have no measurable cumulative effect on wildfire risk. Recent fires, including Evans West, Skeleton, Horse Ridge, and Paulina have created large areas of reduced fuel loadings that reduce the risk of an uncharacteristic wildfire event moving into or out of the planning to the southwest, west, and northwest. To the south, the relatively limited acreage prescribed for treatment in the Aspen planning area would likely continue a relatively high risk of an uncharacteristic wildfire moving into the southern portion of the Opine planning area and threatening improvements and facilities. There are no identified actions proposed or being implemented by the BLM on lands managed by that agency to the north or east of the planning area. Under normal conditions, a fire initiated in either of those areas is not likely to move onto National Forest lands. It more likely that a fire initiated within the planning area would move onto BLM managed lands. This risk would be reduced under both action alternatives due to the reduction and breaking up of fuels.

Under Alternative 1, No Action, the lack of treatment in the Opine area would increase the risk of a high intensity fire starting in the planning area and expanding into adjacent areas. A low intensity fire starting in an adjacent, untreated area would have an increased potential for expansion into the Opine area and developing into a high intensity wildfire. Under Alternatives 2 and 3, this risk would be reduced. The proposed treatments would be expected to continue to provide an integrated network of treated areas that would serve to break up fuel continuities and reduce the risk of a high intensity wildfire. Additional escape routes and safety zones would be created allowing for reduced risk of the public or firefights becoming trapped, injured, or killed during wildfire events. On a landscape scale, the risk of a large scale fire, one in excess of 1,000 acres would be reduced.

Under all three alternatives, the removal of approximately 300 trees to restore telescope views and to construct new facilities would also help to break up both vertical and horizontal fuel loadings. This in turn would help to reduce the risk of a wildfire causing damage to or threatening structures or users. Alternative 1 would see the least reduction in the risk and threat because no adjacent areas would be treated to reduce fuel loadings and increase the chance of control prior to a fire reaching the observatory area. The level of risk under Alternatives 2 and 3 would be similar given that the same priority areas would be treated. The risk and potential would be somewhat greater under Alternative 3 because some areas proposed for treatment under Alternative 2 would not be treated under Alternative 3. Given that these areas are generally more remote from the observatory; the relative difference in risk is considered to be minimal.

The development of new facilities at the Pine Mountain Observatory is not expected to have a measurable effect on wildfire risk under any of the three alternatives. The observatory does not expect the number of visitors to increase to the facilities above current levels of 2,500 to 3,000 people. There would be no measurable change in the risk of a fire being caused by a visitor.

There is no measurable cumulative effect of grazing or grazing related activities and improvements on the level of wildfire risk under any of the three alternatives. Livestock have no impact on the quantity or distribution of larger fuels, one hour and larger fuels, common to forested areas. Livestock target vegetation that contributes primarily to fine fuel loadings – grasses, forbs, and to a more limited extent, fine branches and twigs. Livestock do help to decrease fuel loadings and decrease the risk of wildfire. Although some annual reduction in the levels of fine fuels is reasonably expected, the duration, timing,

and quantity of material removed by grazing does not materially reduce overall fuel loadings on the landscape

## Analysis Issues

### Fire and Fuels

**Defensible Space/Safety Corridors –**Protecting the electronic sites on Pine Mountain also serves to protect important communications. The Deschutes County Sheriff maintains a repeater at the Observatory site; the Antelope site contains relay facilities for several telephone companies that provide communication services across Central Oregon, the entire state, the region, and to other parts of the United States. The BPA substation and transmission corridor provides for the transfer of surplus electricity to and from dams and other generating facilities and utilities in the Pacific Northwest to and from utilities and generating facilities in California.

Major roads would be used a defensible space where public safety is of high concern. Roads that provide defensible space would also provide safe escape routes in the event of a wildland fire for firefighters and the public. Suppression actions would be considerably less hazardous for firefighting personnel, the effectiveness of aerial delivered retardants would be enhanced, detrimental effects on soils from intense wildland fire would be reduced, and need to construct mechanical fireline would also be reduced. All suppression options including the ability to construct handline would be improved with safe access and defensible space occurring along the major travel routes. Roads 2017, 18, 23, 25 and 2510 are identified as defensible space roads (fuel break/safety corridor).

**Alternative 1:** Under Alternative 1, no defensible space/safety corridors would be established. No defensible spaces would be created around high value resources and facilities such as the Pine Mountain Observatory, electronic sites, or the BPA substation. These areas are located on ridges above areas with high and increasing fuel loadings. There would be either a lack of or a reduction in the number of escape routes and safety zones. Fuel loadings adjacent to these and other roads would continue to increase with a corresponding increase in the risk and probability of members of the public and/or firefighters being trapped behind or within the boundaries of a wildfire event with few or no safety routes for escape. Safe access to a wildfire event for firefighters would also be limited or non-existent, limiting the opportunity and ability of firefighters to safety fight and contain the fire.

**Alternatives 2 and 3:** The two action alternatives would reduce the risk of damage to or loss of these facilities/sites. This is especially important for preventing disruption from energy transfer between the Pacific Northwest and California and the county sheriff's repeater, which provides communication to more remote locations in central and eastern Deschutes County, including the Opine planning area.

Both action alternatives would create new defensible space/safety corridors along Roads 18, 2017, 23, 25, and 2510. Under Alternative 2, units F08, F14, F19, F28, F29, F31, F33, F35, F40, and F41 would create approximately 475 acres of defensible space along approximately 13 miles of Roads 18, 23, 25, and 2510 (with units of approximately 150 feet on either side of the road). These are augmented by additional treatments in units F02, F03, F05, F13, F15, F20, F21, F23, F25, F26, F30, and F34. These fuel units are further augmented by vegetation treatments in adjacent commercial and non-commercial harvest units. Additionally, units F01, F04, F06, F07, F09-F11, F16-18, and F36-F39, as well as adjacent vegetation units, also would help to provide additional width to the safety corridors, particularly along Roads 2017 (five (5) miles) and 2017-100 (four (4) miles) for both the public and fire fighters (Fire/Fuels and Air Quality Report). Although Road 2017-100 is not identified as a defensible space road, it provides access to the Antelope electronic site at the east end of Pine Mountain.

These treatment areas reduce fuel loadings, reduce the risk of spotting, increase the potential for control, and provide additional safety for both the public and firefighters to safely enter and leave the area in case of a wildfire event. All or portions of some safety corridor units do not have adjacent fuel or vegetation treatment units. In Alternative 2, this includes units F08, F19, F29, and F31 along Road 23 and units F28, F33, and F41 along Road 18. In Alternative 3, this includes units F08, F19, F27, F29, and F33 along Road 23 and units F33, and F41 along Road 18. In these areas, both the public and firefighters would face a higher risk of being trapped by a wildfire event or having a less safe route than areas with additional treatments adjacent to the safety corridor unit. Both alternatives provide a greater level of safety for ingress and egress than the no action alternative, which provides no treatment along roads and provides no safe ingress or egress. Both alternatives also reduce the risk of a wildfire approaching from the west or southwest from reaching the observatory.

Alternative 3, approximately 537 acres of defensible space would be created along approximately 13 miles of road in the same units as Alternative 2 with the following exceptions: units F25 and F26 are dropped from Alternative 3. With the exception of units F08, F19, and F27, the average width of each unit would be 300 feet or approximately 150 feet on each side of the road. The average width of unit F08, F19, and F27 would be approximately 400 feet or approximately 200 feet on either side of the road because units F25 and F26 would not be treated under this alternative. Like Alternative 2, adjacent vegetation units would also contribute to the establishment of defensible space along these roads.

Both action alternatives propose thinning, mowing, and the use of prescribe fire either singly or in combination to reduce fuel loadings. Thinning is potentially effective at reducing the probability of crown-fire spread and is precise in that specific trees are targeted and removed from the fuel bed. This creates discontinuities in both the vertical and horizontal fuel beds and has been shown to be effective at reducing the impacts of a wildfire event. As an example, the 1999 Spring River Butte Fire started in a 75 acre stand of unthinned trees and was moving towards the Sunriver Resort when it entered a 30 acre stand that had been previously thinned. The fire dropped from the crowns of the trees to the ground allowing the fire to be controlled and limiting the burned area to approximately 112 acres. In untreated areas or portions of treated units, the risk of a crown fire would remain and continue to increase with increasing fuel loadings and stand densities.

Prescribe burning and mowing affects potential fire behavior by reducing fuel continuity on the ground. This slows the rate of spread, which reduces intensity and flame lengths and the likelihood of fire spreading into ladder fuels and the crowns of trees. The risk and probability of a crown fire would be reduced under both action alternatives. Alternative 2, because it physically treats more acres with fuel reduction, vegetation, and a combination of treatments, has a greater reduction in the risk and probability of such an event than does Alternative 3. Given the distribution of treatments on the landscape, there is little or no difference on the risk to protection of important resources, such as other improvements, facilities, and wildlife habitat under either of the two action alternatives.

**All Alternatives (long-term):** In 10 years or longer, Alternative 2 provides greater protection than does Alternative 3 because it places more acres into the low fire behavior potential category and has fewer acres in the moderate potential category (Table 3-48). Treatments to maintain or reduce fire behavior potential levels would be needed much sooner under Alternative 3 as more acres move into higher risk fuel loadings.

Acres with current high fuel loads would require multiple treatments of existing accumulations to achieve the desired results. In the areas where restoration/maintenance of historic fire regimes is proposed, prescribe fire activities would need to be implemented approximately every 8 to 15 years to maintain the desired conditions (Fire/Fuels and Air Quality Report).

**Cumulative Effects:** There are no identified cumulative effects associated with defensible spaces under any of the three alternatives. The nearest identified wildland-urban interface (WUI) is located adjacent to the City of Bend, approximately 15 to 18 miles northwest of the planning area. Other human settlements, predominately scattered ranches with homes and associated outbuildings, are located to the north of the planning area. These houses and associated buildings are located on private lands interspersed among lands managed by the BLM. There are no identified proposals to create defensible spaces around these sites.

Road 18 is a major travel route that connects from the southern boundary of the City of Bend south to the southern boundary of the Forest and Fort Rock. It traverses not only the Opine planning area, but also the Fuzzy, and South Bend HFRA planning areas to the west and northwest. No efforts were made to specifically establish safety corridors along Road 18 in the Fuzzy planning area. The Skeleton fire did result in creating some areas along the road. Several units along the south side of the road also would help to serve this purpose. The combination of past and proposed treatments associated with these three project and past fires would provide a approximately 25 to 30 miles of defensible space/safety corridor along Road 18.

Road 23 connects U.S. 20 to the north of the planning area to the southern portion of the Bend-Fort Rock Ranger District and into the Fort Rock Valley. In addition to traversing the Opine planning area, it also traverses the Aspen planning area. Neither the Aspen planning area to the south nor the BLM managed lands to the north have created defensible space/safety corridor areas. Safety for public and firefighter access and egress within the planning area along Road 23 would be enhanced within the planning area, but would be compromised outside of the planning area due to the lack of these corridors.

## Fire and Fuels

### Access

Closing or decommissioning of roads has the potential to increase response time of ground based suppression resources to fire starts, especially those associated with lightning as most human caused fires are in close proximity to roads. The potential increase in response time could, under certain weather and fuel moisture conditions, lead to larger fires.

**Alternative 1:** No roads would be closed or decommissioned under Alternative 1. Access for fire suppression activities would remain at current levels.

**Alternative 2 and 3:** There is no measurable difference between the two action alternatives on the closing or decommissioning of roads on the subsequent ability of suppression resources to successfully control wildfire in the planning area. Although Alternative 3 closes more miles of road than Alternative 2 (approximately 27 miles versus three (3) miles), closed roads are not subsoiled and the roadbed remains in place. Administrative use, including fire suppression activities can quickly reopen and utilize the road. Most roads proposed for closure are located on relatively flat or gentle terrain thereby allowing suppression forces opportunities to easily access closed areas. There is no difference in the number of miles of road proposed for decommissioning under either alternative. Both would have approximately 10 miles of road decommissioned by subsoiling. These roads would generally be unavailable for the purposes of fire suppression activities.

The additional four (4) miles proposed for decommissioning under Alternative 3 are proposed for conversion to a class II OHV trail under a separate decision and as such, would remain available to use for fire suppression activities (2300-080 and 2017-400). However, the type of maintenance that would be performed on these segments is different than that which is performed on system roads. This may restrict the size and/or type of fire suppression vehicles that could travel these segments and could reduce the

ability of suppression crews to control a fire. Impacts to fire suppression activities would be the same under all three alternatives.

## Air Quality

The Clean Air Act was passed in 1967 to protect the air quality and provide for public health and welfare. States were given the responsibility to manage for air quality and regulate for the National Ambient Air Quality Standards and State level standards through a State Implementation Plan. Include in this plan is the Smoke Management Directive that is applicable to prescribed burning on national forest lands.

Smoke contains pollutants including tiny particles called particulate matter (PM). Particulate matter can cause significant health problems, especially for people suffering from respiratory illness. Based on recent research, the Environmental Protection Agency (EPA) revised the air quality standards to provide better health and visibility protection. Under the new standards, techniques must be considered that minimize smoke emissions and the impact of smoke on public health and the environment.

Smoke management is regulated by The Oregon Department of Forestry according to the Oregon Smoke Management Plan under Oregon revised statues 477.013. The air quality objective is to improve the management and minimize emissions from prescribed burning to be consistent with the Interim Air Quality Policy on Wildland and Prescribed Fires, Federal Clean Air Act, and the State of Oregon Clean Air Act Implementation Plan developed by the Department of Environmental Quality under ORS 468A.035 (1989 c.920 s.2). All burning is conducted in accordance with requirements of state and local agency air quality regulations and Oregon Smoke Management instructions and requires a written burn plan. The burn plan outlines analysis of involved factors that derive burning prescriptions to be followed that assures smoke emissions to not exceed limits in accordance with federal Prevention of Significant Deterioration (PSD) regulations (Operations Guidance for the Oregon Smoke Management Program).

Federal land management agencies, including the USDA Forest Service (USFS), are required by law to follow the direction for the protection of air quality for conducting prescribed burning operations. Smoke management weather forecasts and instructions, as provided by the Oregon Smoke Management Plan and the Operational Guidance for the Oregon Smoke Management Program (Directive 1-4-1-601) are to be followed.

On the Deschutes National Forest, prescribe burning is accomplished during the spring and early summer when dilution, dispersal, and mixing conditions are generally good to excellent. Prescribed burning also occurs during the fall and winter when conditions are more restrictive. The Deschutes National Forest requires a public notification to be conducted. This is accomplished using local media, Forest Service websites and occasional door to door announcements, when appropriate, in affected neighborhoods prior to burning operations. Additionally, signs, including maps, are posted for local residents at entrances to subdivisions and mail centers.

***Consumption of Fuel and Smoke Emission***

Studies from the Columbia River Basin Analysis show that emissions from wildfires are 50 to 70 percent greater than that of prescribed burns. The potential particulate matter of 10 microns (PM10) from wildfires is twice the amount as from a prescribed fire of the same size. Smoke management studies shows approximately 80 to 90 percent of fuels are consumed in the flaming phase and 10 to 20 percent consumed in the smoldering phase.

Emissions from fire (smoke) results in the release of particulates into the atmosphere, possibly affecting human health. According to the Clean Air Act of 1977 and 1990, Federal Land Managers will attempt to

"protect and enhance the quality of Nation's air resources so as to promote the public health and welfare……"

The critical pollutants thought to affect human health include particulate matter emitted in smoke that is less than 10 microns in diameter (PM10). Particulates less than 10 microns are able to traverse the nose and mouth and enter the upper airways. Due to their small size and weight, PM10 can remain airborne for weeks. Over ninety percent of smoke particles are less than 10 microns. Wood smoke has been documented to be mutagenic, though no direct studies have proven it carcinogenic to humans. Mutagenic compounds cause changes to structure of a cell in ways that can be transmitted during cellular division. This is of primary concern because mutation can be precursors for cancer. Exposure to PM10 aggravates chronic respiratory disease such as asthma, bronchitis and emphysema.

Burning debris will release carbon dioxide and water (approximately 90 percent of total mass emitted from the combustion process); criteria pollutants (those pollutants regulated by the EPA under the Clean Air Act) including carbon monoxide and sulphur / nitrogen oxide; and hazardous air pollutants (also known as "air toxins"). Air toxins include several hundred known substances including the class of compounds known as aldehydes (formaldehyde, acetaldehyde and acrolin) and polynuclear aromatic hydrocarbons (PAHs), several of which are known to be carcinogenic.

Research to date has yet to determine if levels of pollutants and durations of exposure from prescribed fire operations significantly affect human health. According to sources at the Environmental Protection Agency (EPA), particulate matter that exceeds human health standards have been measured up to three miles downwind of prescribed burns. Studies conducted by the California Department of Health Services, John Hopkins University and the National Institute for Occupational Safety and Health, indicate that small but significant changes in pulmonary function occur when wildland firefighters are tested before and after a single fire season. The exposures of wildland firefighters to CO over a full shift are generally well below occupational health limits. However, brief (one (1) minute) peak exposures exceeding short-term limits of 200 parts per million of CO do occur. These limits are not to be exceeded for any period of time.

A study of emissions in the Central Oregon area found slash burning to contribute less than 1 percent (.34 percent) of particulate matter (PM). The same study found that slash burning also produced less than One (1) percent (.64 percent) of the carbon monoxide in Central Oregon.

***Prevention of Significant Deterioration to Air Quality***

The prevention of Significant Deterioration (PSD) provisions of the Clean Air Act requires measures to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural recreation, scenic, or historic values." Stringent requirements were established for areas designated as "Class 1" areas (42 U.S.C. 7475(d)(2)(B). Designation as a Class 1 area allows only very small increments of new pollution above already existing levels. The Three Sisters Wilderness Class 1 air-shed is approximately 25 to 30 miles northwest of the northwestern end of the project area. Bend, Oregon is the closest Designated Area (*) as defined by the Oregon State Smoke Management Plan.

* A Designated Area as defined by Oregon State smoke Management Plan is a principal population center.

***Meteorological Patterns***

Weather patterns are primarily from the west and northwest during the period from April through September. Airborne particulates matter is generally dispersed to the east and southeast during the fall and winter months. However, tracks of lightning storms that typically result in natural ignitions typically

come from the south and southwest. From October through March, winds come from predominately the south and southwest.

Temperature changes throughout the day affect how particulate matter and other pollutants are dispersed. Daytime heating causes pollutants to rise along with heated air. Surface cooling at night can create downslope winds that carry pollutants from higher elevations to lower lying areas. Pollutants may pool in the lower areas or exit to the northeast following several dry drainages.

***Visual***

Smoke emissions vary with combustion efficiency and quantity of fuel consumed. Machine and hand piles tend to produce more smoke (per ton of fuel consumed) than other burns because much of the consumption occurs during inefficient smoldering phase of combustion. The overall factor in the amount of emissions produced lies solely in the amount of fuel consumed.

***Environmental Effects***

**Alternative 1:** With no fuel reduction activities proposed under Alternative 1, a high intensity wildfire would be expected to produce an average of approximately 195 tons of smoke particular matter (PM) of 10 microns or less in size (PM10) per acre. In large accumulations of downed fuels and/or dense stands, PM quantities can exceed this estimate. Conditions, especially in forest stands under summer conditions, are usually windy, hotter, and drier. As a result, fires consume greater amounts of down woody material (coarse woody material) in addition to litter, duff, and foliage materials. Residents of the City of Bend, although approximately 20 or more miles to the northwest of the planning area, would be expected to be impacted by smoke generated by intense wildfire events.

These levels of smoke production are also expected to impact activities and people using the facilities at the Pine Mountain Observatory. Astronomy requires clear, unobstructed skies. Wildfires emit 50 to 70 percent more emissions than do prescribe fires. Smoke diffuses and scatters light and creates hazy atmospheric conditions. PM10 and smaller particles can remain suspended in the atmosphere for extended periods of time. This greatly reduces the ability to conduct astronomical research that utilizes optical telescopes such as those at the Pine Mountain Observatory. This is further compounded by the fact that wildfires can emit smoke over a period of weeks or months which can adversely affect research activities over a much longer period of time.

**Alternatives 2 and 3:** Table 3-26 displays the total estimated PM10 emission associated with fuel treatment activities under both Alternatives 2 and 3 under planned burn prescriptions. It is important to note that these estimates may vary and either increase or decrease depending upon the actual conditions under which the prescribe burns are implemented. These estimates are for the total project. As implementation is likely to be spread over a period of a decade or more, yearly PM10 emission levels would be much less.

**Table 3-26 Total Estimated PM10 Emissions for Alternatives 2 and 3**

| Treatment Prescription | Total Estimated Tonnage of PM10 | |
|---|---|---|
| | Alt 2 | Alt 3 |
| Landing Piles | 15 tons | 15 tons |
| Underburning (Includes Drip and Broadcast) | 1,628 tons | 1,524 tons |
| Machine and Hand Piles | 1 ton | 1 ton |
| Total | 1,644 tons | 1,324 |

For comparison purposes, and using the above figures, including the estimated 195 tons per acre of PM10 generated by a wildfire, the 1,644 tons generated under Alternative 2 and the 1,324 tons generated under Alternative 3 correspond to a wildfire of approximately 8.4 and 6.8 acres respectively. Given that fuel reduction treatments are proposed on approximately 26,830 acres under Alternative 2 and 23,990 acres under Alternative 3, a wildfire of comparable acreage would generate an estimated 5,231,850 tons of PM10 under Alternative 2 and approximately 4,678,050 tons of PM10 under Alternative 3.

In addition to lower production of PM10, both action alternatives would also spread the emission of PM10 out over a period of years, with only a relatively small portion occurring at any one time or during any given year. This is in strong contrast to a wildfire which would produce the entire quantity within a relatively short time period, days or weeks at most.

Prescribe fire activities are also implemented during periods of specified weather conditions which control the rate and quantity of material consumed, the amount of smoke generated, and the direction in which the smoke travels. This allows smoke to be directed away from populated areas such as the City of Bend or away from the Observatory. In the case of the observatory, it also helps to minimize the period of time that particles are suspended in the atmosphere and potentially impacting astronomic observations. Under wildfire conditions, managers have no control on any of those or any of the other factors that determine the quantity or direction of smoke and PM10 and smaller materials.

All burning would be conducted in compliance with the National Ambient Air Quality Standards and Oregon Department of Forestry Smoke Management regulations and restrictions. Burning would only occur during favorable existing and forecasted weather conditions to assure smoke dispersion away from the community of Bend. Burning would also be coordinated with the staff at the Pine Mountain Observatory to minimize impacts and disruptions to both people and research.

**Cumulative Effects -** Implementation of Alternative 1 would have no cumulative effect on slash disposal activities within the air-shed in which the Opine planning area is located. No slash disposal work would be necessary under this alternative. Alternatives 2 and 3 do have cumulative impacts slash disposal activities within the air-shed. The amount of particulate matter permitted to be entered into the atmosphere is determined by the State of Oregon through smoke management regulations administered by the Oregon Department of Forestry. Slash disposal activities are given permits to burn on a first come, first served basis. Once the daily limit or quota is reach, subsequent projects are rejected and required to apply for following days. This has the potential to extend the time necessary to treat all the slash and hazardous fuel loadings that need to be treated and increasing the risk for those areas which are not or cannot be treated due to smoke management requirements and limitations.

A concern voiced by the Observatory is the effect dust has on not only the ability to view the night skies, but also its effect on sensitive equipment. Fire, both prescribe and wildfire, produce particulate that contribute material to the atmosphere that affect not only clarity of the night sky but also potentially the sensitive equipment used. Under Alternative 1, the primary local sources of particulate pollution would remain dust generated by vehicle traffic. Wildfires would become the predominant source if and when they occur. In contrast to dust from local roads and trails generated by vehicles which tends to be relatively short in duration and localized in extent, particulate associated with burning tends to be long lived and more extensive in area. Wildfires, especially uncharacteristic ones, can greatly reduce both the clarity of the sky and affect the workings and sensitivity of the equipment for extended periods of time by significantly increasing the volume of material present in the atmosphere.

In contrast, Alternatives 2 and 3, because of the limitations imposed by smoke management rules and burning prescriptions, produce less particulate matter and result in lower levels of atmospheric

contaminants when combined with road and trail dust. Burns can also be scheduled to take advantage of winds that either move the smoke away from the observatory or move it more quickly out of the area and either maintaining or restoring the clarity of the sky for viewing. Lower dust levels also reduce the risk of damaging sensitive equipment.

## Botany

**Proposed, Endangered, Threatened, and Sensitive (PETS) Plant Species**

***Existing Condition*:** Appendix A (pages 17-18) of the "Biological Evaluation - Proposed, Endangered, Threatened, and Sensitive Plants, Opine Project" (Plant BE) lists all the plant species suspected or documented to occur on the Deschutes National Forest. This list includes three (3) mosses, two (2) lichens, and one (1) fungal species that were added to the list in 2004.

The potential for sensitive plant species' habitat to occur in the project area was evaluated using information on soils, plant associations, and physical site characteristics including elevation, the presence or lack of permanent water, and precipitation. Resources used to identify potential sensitive plant habitat were aerial photo interpretation, vegetation map information, as well as personal knowledge of the project area.

Soils on Pine Mountain are comprised primarily of volcanic ash with some pumice lapilli over loamy colluvium and residual soils. Ridge tops contain both sandy volcanic ash and sandy to loamy residual soil. The remainder of the planning area consists of soils comprised of sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils (Plant BE page 6).

The dominant plant associations on Pine Mountain include:

- big sagebrush-bitterbrush/bunchgrass;
- ponderosa pine/bitterbrush-manzanita / fescue; and
- ponderosa pine/bitterbrush / fescue.

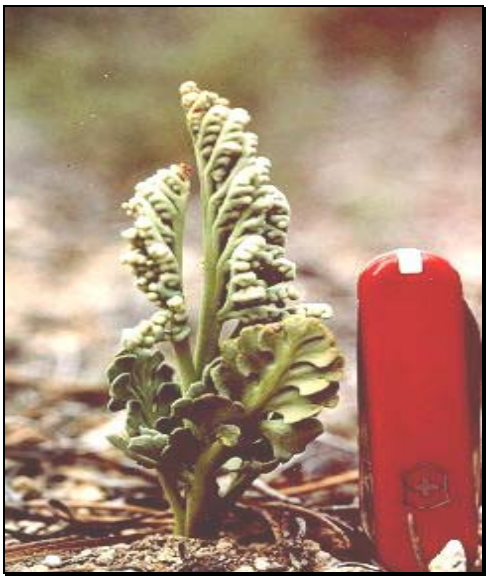
In the remainder of the planning area, plant associations include:

- ponderosa/bitterbrush-sagebrush (rhyolite);
- ponderosa/bitterbrush / squirreltail (rhyolite); ponderosa / bitterbrush-sagebrush / fescue; lodgepole/bitterbrush (rhyolite); and
- big sagebrush/bunchgrass (Plant BE page 6).

Elevations within the planning area range from a low of approximately 4,500 feet in Tepee Draw at the forest boundary to approximately 6,500 feet on the ridgeline between the Observatory and the Antelope electronic site on the east side of Pine Mountain. Average annual precipitation ranges from approximately 15 to 20 inches. There are permanent or semi-permanent water bodies (lakes, ponds, rivers, or streams) within the project area. There are three (3) springs including Sand Springs and Pumice Springs (2).

Surveys conducted over the past 10-15 years have surveyed approximately 75 percent of the planning area including 100 percent of Pine Mountain. Any potential habitat not previously surveyed was also surveyed within the past three (3) years. Two (2) species, the pumice grape fern (***Botrychium pumicola*** - BOPU) and the green tinged paintbrush (***Castilleja chlorotica*** - CACH) (Figure 3-3), have known habitat and are documented to occur within the planning area. Appendix B of the Plant BE (page 19) contains habitat descriptions for these two species.

Figure 3-3 Pumice Grape Fern (left) and Green Tinged Paintbrush (right) (USDA Forest Service)



Surveys located 21 sites/populations of the pumice grape-fern in the planning area. They total approximately 2,600 plants or approximately 10 percent of the estimated global population of approximately 25,700 plants (Plant BE page 7).

Surveys located 225 sites/populations of the green-tinged paintbrush in the planning area. They total approximately 26,000 plants. There are an estimated 30,000 plants on the Deschutes National Forest and an additional approximately 500,000 plants on the Fremont National Forest. There are an unknown but relatively small number located on BLM managed federal lands. The numbers in the planning area constitute approximately five (5) percent of the global population and approximately 87 percent of Deschutes National Forest population (Plant BE pages 7-8).

No habitat for Threatened, Endangered, Proposed, or Candidate plant species exists in the planning area. A complete list of these species can be found in the Appendices C and D of the Plant BE (pages 23-28). The lone exception is ***Botrychium lineare***, a Candidate species. It has a very wide range with an equally wide range of habitats. It has not been found within the planning area nor elsewhere on the Deschutes National Forest despite 15 years of project-level surveys. The nearest known site lies in Wallowa County in northeastern Oregon (Plant BE page 7). There would be no measurable short-term (10 years or less) direct or indirect effects of vegetation or fuel reduction treatments on populations of either species under Alternative 1. No treatments would be implemented under this alternative (Plant BE page 15).

***Environmental Effects – Alternative 1*** **-** Long-term, the next 1 to 2 decades, the failure to implement fuel reduction treatments is likely to increase the risk of damage or loss of individuals or populations of green tinged paint brush within the planning area due to catastrophic wildfire. Fire exclusion has permitted shrubs to grow and proliferate. The paintbrush prefers mid- to late-seral shrub communities in this portion of its range. A wildfire ignited in or burning through these communities would likely result in the death of paintbrush plants in burned areas due to the elimination of its host, the older shrubs. Although such an event would likely eliminate local populations and individuals, it would not likely measurably impact the world population because only approximately five (5) percent (approximately 26,000 plants) of the known world population is located in the planning area. Assuming no catastrophic wildfire, this alternative would maintain more mid- to late-seral shrub habitat preferred by the paintbrush.

A wildfire would not be expected to measurably affect individuals or populations of the pumice grape fern, because its habitat, the pumice flats, contains little or no vegetation capable of sustaining a wildfire of sufficient intensity or duration to affect those individuals or populations.

Illegal firewood cutting, dispersed camping, and off-road vehicle use pose considerable threats to the pumice grape-fern in particular, because of the habitat it prefers—open, sandy frost pockets. The threat comes from soil displacement which then displaces the plants, which are rooted only 2 to 3 inches below the soil surface (see Figures 3-4 and 3-5). These activities also are a threat to green-tinged paintbrush, but because it generally prefers habitats with a shrub component, the plants are often more protected, though by no means do the shrubs confer total protection from these activities which pose a continuing threat to the well-being of high quality TES plant habitat.

**Figure 3-4 Soil Impacts Associated with Off-Road Motorized Vehicle Travel in Pumice Soils, Pumice Grape Fern Habitat, Opine Planning Area.**

**Figure 3-5 Soil Displacement Associated with Off-Road Motorized Vehicle Travel, Pumice Grape Fern Habitat, Opine Planning Area**

Approximately 1,567 acres of detrimentally impacted soils are located within the planning area. The majority of these sites, totaling approximately 956 acres, is associated with past timber harvest activities and includes landings, skid trails and other related disturbances. Under this alternative, these sites would not be further disturbed and creating sites of exposed mineral soil that would provide habitat for invasive plants including noxious weeds. Although many may not current provide habitat for the paintbrush due to the lack of obligate shrub species, over time, these sites have the potential to provide habitat for the paintbrush without competition from invasive plants. There are no known sites of detrimentally impacted soils associated with past logging located within existing pumice grape fern habitat.

***Alternatives 2 and 3*** **-** Both Alternative 2 and Alternative 3 may impact individual green tinged paintbrush plants or habitat, but neither is likely to contribute towards federal listing or cause a loss of viability to the population or species (Plant BE, page 15). There are no major differences between the two alternatives as both treat approximately the same number of acres of paintbrush habitat.

Although both alternatives have mitigation measures that will exclude green-tinged paintbrush populations from units, some mortality is expected to the species under both action alternatives as a result of project implementation. The extent of the loss is impossible to determine, especially in units treated with prescribed fire, because of the random pattern of burning and the creeping of fire beyond intended treatment areas. The number of treatment units in each alternative that contain populations of paintbrush, coupled with human error due to misunderstandings and oversights associated with the large scale of acres proposed for treatment, are also likely to contribute to potential losses. There are approximately

5,000 plants located within proposed treatment units under each of the action alternatives. Assuming a worst case scenario of 100 percent mortality, this would result in the loss of approximately 19 percent of the known local population, approximately 17 percent of the known Deschutes National Forest population, and approximately one (1) percent of known world population.

Any potential, currently uninhabited paintbrush habitat would be compromised by burning. This is due to this species' preference for mid- to late-seral shrub layers in this portion of its range. Current professional opinion holds that this species will not re-enter a site until such time as a suitable host plant is well established. The time period required is not clearly known, however, an estimate of 20 years at the earliest is reasonable (Plant BE pages 11 and 14).

Vegetation treatments, including commercial and non-commercial harvest two units within Alternative 2 and four units within Alternative 3, would also not be expected to result in any measurable impacts (although individual plants may be damaged or destroyed during or as a result of operations). Populations would be identified, flagged, and excluded from treatment.

Burning of slash would result in the loss of existing or potential habitat by removing mid and late-seral shrubs that the paintbrush depends on. Regeneration of paintbrush could take 20 years or more depending on the recovery and regeneration of shrubs.

Long-term, proposed vegetation and fuel reduction treatments would reduce the risk of a high intensity wildfire damaging or destroying large areas of habitat or large numbers of individuals. Losses would be expected from both the wildfire and the associated firefighting efforts.

Subsoiling of roads, landings, and skid trails would have no immediately measurable impacts on the paintbrush or its habitat. However, as this activity helps to rehabilitate soils and encourages the regeneration, establishment, and growth of new vegetation, this would potentially increase available habitat over the long period.

Management activities, particularly timber harvest and the burning of slash piles, create sites of exposed soil that provide habitat for invasive plant species such as noxious weeds and non-native species such as cheatgrass. There is no measurable difference between the two action alternatives associated with the exposure of mineral soils and the creation of habitat for invasive species on existing or potential paintbrush habitat. Both action alternatives would minimize the creation of new additional mineral soil by utilizing existing landings and skid trails wherever possible. Alternative 2 would create approximately 714 acres and Alternative 3 approximately 775 acres of additional disturbed soils in the planning area. The majority of these acres are located within existing or potential paintbrush habitat. Establishment of invasive plants could remove these areas for colonization by the paintbrush, thus reducing existing or potential habitat. Both alternatives would minimize the risk of establishing new populations of invasive plants by requiring the washing of equipment prior to moving on to National Forest lands or between areas. Areas with disturbed soils, including landings, skid trails, and areas that have been subsoiled, would be monitored and new populations of invasives would be controlled or eradicated using appropriate methods which may include the use of approved herbicides. This would reduce the risk of invasives becoming established in new areas and reducing existing or potential paintbrush habitat.

Neither Alternative 2 nor Alternative 3 would have any measurable effect on the population, individuals, or habitat of the pumice grape fern because no activities are planned there, with one exception which may lie within a unit; it would be avoided during unit layout. Neither alternative would therefore contribute to a trend towards federal listing or the loss of viability to the population or species (Plant BE page 15). This species is primarily located in the pumice flats southeast of Pine Mountain.

Vegetation treatments proposed in lodgepole pine stands in the southern portion of the planning area in both alternatives would temporary reduce the rate of encroachment of lodgepole pine into existing grape fern habitat by removing some of the adjacent lodgepole pine seed source. The impact would be limited to areas immediately adjacent to treatment areas and would likely not exceed 10 years.

**Noxious Weeds and Other Invasive Plants**

***Existing Condition:*** Aggressive non-native plants, or noxious weeds, can invade and displace native plant communities causing long-lasting management problems. They can displace native vegetation, increase fire hazards, reduce the quality of recreational experiences, poison livestock, and replace wildlife forage. By simplifying complex plant communities, they reduce biological diversity and threaten rare habitats. Potential and known weeds for the Deschutes National Forest are listed in Appendix A of the Noxious Weed Assessment (pages 13-14).

Noxious weeds are designated by the State of Oregon.

There is a group of non-native plants that are also aggressive though are not officially termed "noxious". These species are included in this analysis.

President Clinton signed Executive Order 13112 on February 3, 1999 which requires federal agencies to utilize relevant programs and authorities to prevent the introduction of invasive species and not authorize or carry out actions that are likely to cause the introduction or spread of those species unless the agency has determined, and made public, documentation that shows that the benefits of such actions clearly outweigh the potential harm. It also requires that all feasible and prudent measures be taken in conjunction with those actions to minimize the risk of harm. The implementation of this Executive Order is supported by the USDA Forest Service ***Guide to Noxious Weed Prevention Practices*** (July 2001).

The Guide lists a number of goals and guidelines relevant to proposed timber harvest and fuel reduction activities. A complete list of the relevant goals and guidelines pertinent to this proposal as well as current and on-going activities that support implementation of Executive Order 13112 are listed in the Weed Assessment on pages 9-11. These are also represented in the mitigation measures and management requirements proposed for this project.

Manual direction requires that Noxious Weed Risk Assessments be prepared for all projects involving ground-disturbing activities. For projects that have a moderate to high risk of introducing or spreading noxious weeds, current Forest Service policy requires that decision documents must identify noxious weed control measures that will be undertaken during project implementation (Noxious Weed Assessment page 2).

Region 6 of the Forest Service (Oregon and Washington) prepared an invasive species environmental impact statement with the final EIS released in June 2005. The ***Record of Decision for Preventing and Managing Invasive Plants*** (ROD) was signed in October 2005. It amends the LRMP by incorporating additional standards and guidelines to address the management of invasive plants. Two specifically address prevention of weed introductions into projects. Standard 1 states *"Prevention of invasive plant introduction, establishment and spread will be addressed in watershed analysis; roads analysis; fire and fuels management plans, Burned Area Emergency Recorvery Plans; emergency wildland fire situation analysis; wildland fire implementation plans; grazing allotment management plans, recreation management plans, vegetation management plans, and other land management assessments."* Standard 2 states *"Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism (including public works and service contracts), require the cleaning of all heavy equipment (bulldozers, skidders, graders, backhoes, dump trucks, etc.) prior to entering National*

*Forest System Lands. This standard does not apply to initial attack of wildland fires, and other emergency situations where cleaning would delay response time."* (Weed Risk Assessment, Appendix B page 15). These standards obligate the Forest Service to incorporate weed prevention into planning documents and implementation activities.

The Deschutes and Ochoco National Forests are currently preparing an EIS addressing the treatment of invasive plants on both the Deschutes and Ochoco Forests with completion expected later in 2007. The analysis is tiered to the regional invasive species EIS and will provide site specific analyses.

The planning area has been surveyed for noxious weeds and other invasive plants fairly regularly since the early 1990s. The presence of noxious weeds was, and continues to be noted, during sensitive plant surveys. These surveys have shown that, with the exception of Pine Mountain, the planning area is largely free of noxious weeds. Pine Mountain has populations of primarily spotted knapweed (Figure 3-6), but also Canada thistle, bull thistle, dalmatian toadflax, and mullein (an exotic plant). Cheatgrass, an exotic plant, is present at generally low levels across the planning area with localized heavy patches (Weed Risk Assessment page 5).

**Figure 3-6 Spotted Knapweed (USDA Forest Service)**


The following lists the location and number of existing noxious weed sites within the planning area.

1. *Road 2017-100 corridor*. Spotted knapweed. These EA units are adjacent: **P302, P303, P305, P310, P346, C302, and C303 (Alternative 3).**
2. *Road 2017-110*. Spotted knapweed and bull thistle. These EA units are adjacent: **C305, F36, and F38 (both action alternatives).**
3. *Road 2017-350*. Spotted knapweed. This road accesses a paraglider site. This EA unit is adjacent: **F39 (both action alternatives).**
4. *Road 2017-300.* One spot of dalmatian toadflax. These EA units are adjacent: **F06, F39 (both action alternatives).**
5. *Road 2017-540.* Two sites of spotted knapweed. Within this EA unit: **F17 (both action alternatives).**

Herbicide treatment is only authorized along the Road 2017-100 under 1998 decision; hand-pulling is occurring at many of the other sites (Weed Risk Assessment page 5).

***Environmental Effects:*** The weed assessment conducted for this project made the following determination (Noxious Weed Assessment pages 1 and 6):

1. ***The Proposed Action and Alternative 3 have a HIGH risk of introducing noxious weeds into the project area.***
2. ***The No Action Alternative, Alternative 1, has a MODERATE risk of introducing noxious weeds into the project area.***

***Alternative 1 -*** Alternative 1 would continue to present a moderate risk to the introduction and/or spread of noxious weeds because noxious weed populations are present on Pine Mountain and vectors that contribute to the introduction and/or spread of noxious weeds, specifically vehicular use, livestock grazing, and OHV use, would continue.

The risk of the introduction of new populations associated with OHV and other motorized cross-country travel would remain and likely increase. The number and distribution of non-designated motorized vehicle trails is increasing, especially in areas outside of the EFR OHV area where cross-country motorized vehicle travel is allowed. This activity destroys vegetation and creates bare soil conditions suitable for the establishment and expansion of noxious weed populations. Coupled with increasing OHV use, the risk of introducing new populations and species and expanding existing ones is likely to increase in both the short and long-term under this alternative. The risk is lower within the boundaries of the EFR OHV area where motorized use is restricted to designated roads and trails although non-designated trails continue to become established despite prohibitions against such activity.

***Alternatives 2 and 3 -*** Alternatives 2 and 3 were given a high risk ranking of introducing of spreading weeds because of the known spotted knapweed populations on Pine Mountain combined with heavy equipment associated with timber harvest and fireline construction. As in Alternative 1, other vectors would continue to be present, such as cattle grazing, OHV use, ongoing maintenance of the BPA powerline corridor, maintenance at the Antelope and Pine Mountain electronic sites, and dispersed recreation, all of which pose potential threats of weed introduction and spread. Also, in the foreseeable future, there will potentially be designation of a Class II OHV trail and construction of a new powerline corridor, which elevate the concern of weed introductions and spread.

This concern will be lessened through the use of best management practices, appropriate contract specifications in both service and timber sale contracts, and mitigation/management requirements. Heavy equipment would be washed prior to moving into or out of the project area and between treatment units. Landings and skid roads would be located away from existing weed populations. Harvest activities would utilize existing landings and skid trails wherever possible.

It is unknown how many of the approximately 985 acres of identified detrimentally impacted soils present in the planning area associated with past timber harvest activity would be used for proposed activities under each action alternative. These activities would be expected to result in the production of increased habitat, specifically exposed mineral soil, on those sites. Additionally, Alternative 2 would result in an increase approximately 714 acres of exposed mineral soil; Alternative 3, approximately 775 additional acres. Both would provide increased habitat for noxious weeds and other invasive species. Post-activity monitoring would be implemented to catch and eradicate new populations before they had time to become established. Subsoiling to decommission roads and restore skid trails and landings would create potential habitat for noxious weeds. Monitoring coupled with cleaning provisions in contracts and work plans would minimize the risk and identify new

populations with follow-up treatments expected to eradicate those populations before they become established.

Cheatgrass is the weed species with the greatest chance to spread due to the implementation of fuel treatment activities. This species is not considered a noxious weed but is considered an invasive plant. Alternative 1 would have no measurable impact on this species or its habitat because no fuel reduction treatments would be implemented.

Alternatives 2 and 3, because fuel reduction treatments are proposed under both alternatives, have the greatest potential of increasing the quantity and distribution of this species. The risk of expanding the quantity and distribution of this species under both alternatives would be minimized by educating implementation crews about it thereby allowing them to identify it and avoid activities in areas of dense patches.

**Cumulative Effects -** No future vegetation or fuel reduction projects have been identified for the planning area for at least the next 10 to 20 years. Therefore, there are no identifiable, measurable cumulative effects under any of the three alternatives.

Most known populations of noxious weeds and invasive plants are associated with the existing transportation system: particularly system roads but also motorized trails, dispersed recreation sites, etc. It is reasonable to expect that continued use of these would continue to provide opportunities for the introduction and spread of these species. The majority of these introductions would be expected to be associated with recreational or other casual visitors as there are currently no mechanisms in place to require weed prevention measures and it is unlikely that any would be proposed or implemented. The risk and potential would be reduced to some degree through continued road closures and decommissioning as well as the closure of dispersed sites over time. Vehicle use associated with contractors, permittees, and agency personnel would continue to be required to practice appropriate prevention strategies and would therefore be less likely to increase the risk of introduction and/or spread of these species. There is no measurable difference between the three alternatives.

The proposed change in travel management policy and direction would have no measurable short-term effect if either Alternative 1 or Alternative 2 were selected. Implementation of the new direction would take at least three to five (3 to 5) years. Although there is currently no evidence that current cross country motorized travel is resulting in an increase in the number or distribution of noxious weed or other invasive plant populations, the risk would remain and would be expected to increase given the continuing increase in the popularity of OHV activities. Upon implementation of the new policy and direction, the risk would be expected to decline and be limited to areas where motorized travel continued to be permitted.

If Alternative 3 is selected it would have no measurable cumulative effect. The seasonal area closure proposed under this alternative would preclude motorized cross country travel, but would not result in any foreseeable changes in authorized activities.

The continuation of grazing in the Cinder Hill, Pine Mountain, and Sand Springs Allotments will continue to pose a potential threat of introduction and spread of noxious weed populations, under all three alternatives. Grazing is occurring in the Pine Mountain and Cinder Hill Allotments for the next 10 years, resulting from the Cinder Hill Range Analysis EA and in the Sand Springs Allotment under the decision resulting from the Cluster II Range Analysis EA. In those documents, livestock grazing was identified as a vector agent in the planning area in the introduction and spread of existing noxious weeds. At present, most known populations are located adjacent to existing roads. Current grazing

permits require permittees to implement and follow weed prevention measures, including the washing of vehicles. These requirements would be expected to continue.

The Cinder Hill and Cluster II Range Analysis EA's noted that invasive plants, and specifically cheatgrass, were present, particularly around water sets. Cattle grazing have been shown to exacerbate weed problems, but at the time of these EA's, weeds did not appear to be a major concern in grazed areas away from the water sets. There would be no measurable cumulative effects under any of the three alternatives.

The weed control program is expected to continue. It has been successful, in some cases, at reducing weed populations through hand pulling and the application of herbicides. The Record of Decision for the Regional invasive plant EIS provides additional tools, particularly herbicides, to control noxious weeds and other invasive plants. The local invasive plant EIS that the Deschutes and Ochoco National Forests are currently working on is analyzing weed control treatments and will ultimately provide more specific, local direction to control invasives. Implementation of this EIS is expected to result in dramatically-reduced numbers of invasive plant sites and densities across the forest and within the planning area regardless of the alternative selected. Neither hand-pulling or herbicide application is likely to result in a measurable reduction in cheatgrass given that it is not a designated noxious weed, is pervasive, and would remain so across the landscape under any of the three alternatives.

The expansion of the Pine Mountain Observatory special use permit area and the permitted construction of new facilities would have no measurable cumulative effects under any of the three alternatives. Approximately one acre of soil would be exposed to construct new facilities and upgrade the existing infrastructure. Exposure of soil materials would be limited in duration although construction is likely to continue over most of a 10 year period. Disturbed areas would either be restored to pre-construction conditions or would be incorporated into new buildings, walks, parking areas, roads or other facilities and infrastructure. This would minimize the risk and potential for the establishment of new populations. Any populations that did subsequently become established would be eradicated.

Other activities, including dispersed recreation, hang and paragliding, maintenance of utility rights-of-way, maintenance of facilities at the observatory and electronic sites, etc. all provide and would continue to provide opportunities for the introduction and spread of noxious weeds and other invasive plants under all three alternatives. Any activity that creates exposed soils establishes new potential habitats. Contractors, permittees, and others performing work for the Forest Service would continue to be required to meet all requirements to prevent the introduction and spread of noxious weeds and other invasives. Other members of the public not under contract or permit would continue to provide the greatest risk of introduction and/or spread of these species. There are no plans to require these persons to meet the requirements under any of the alternatives although continuing efforts are being made to education the public in ways to minimize the risk.

### Heritage Resources

There are no direct or indirect effects under any of the alternatives. Under the action alternatives all known sites are avoid during project implementation. Unknown sites would continue to be protected through appropriate contract language and on-the-ground protection through either data collection or avoidance. Additional protect measures are identified in implementation guidelines.

No measurable cumulative effects have been identified on cultural resources within the planning area. Past, present and future management actions have avoided and would continue to avoid known sites (Cultural Resources Report page 3).

Grazing, because it has occurred in the planning area for the past 70 or more years, has likely resulted in damage to both known and unknown sites. It is likely that both known and unknown sites were damaged during the early years of grazing, in large part because of the large number of livestock and the periods during which they grazed. Current grazing practices have not been identified to result in further damage to such sites. Coupled with current practices of avoidance and/or data recovery, the combination of grazing and proposed management activities would therefore be expected to have no measurable cumulative effects on either known or unknown sites (Cultural Resources Report page 4).

Alternatives 1, 2 and 3 would continue the risk of cross-country motorized travel impacting known and unknown sites until a new motorized travel policy and direction was implemented.

## Off Highway Vehicles (OHV)

***Existing Condition*:** The Opine planning area has been used for both casual and competitive OHV activities since at least the 1960s. Both the Millican Valley OHV system on BLM managed lands north of the planning area and the East Fort Rock system started from non-designated routes that were used for events and casual riding. Since the designation and subsequent management of these trail systems, many of the original trails have been rehabilitated to reduce trail density and impacts to resources. This has also served to maximize the riders' experience (OHV Report).

Approximately 23 percent (25,976 acres) of the 114,063 acre East Fort Rock (EFR) trail system is located within the boundaries of the Opine planning area. This portion includes approximately 100 miles of designated trails and an additional 28 miles of shared use roads for use by class I and III OHVs (three wheel, quads and motorcycles). This is approximately 38 percent of the 315 miles of trails and shared use roads in the EFR system (OHV Report page 2). Use is restricted to designated routes with motorized cross-country travel prohibited within the trail system area. Use is also restricted to class I and III OHVs only. The trail system is currently open all year although historically, the system has been closed during late July and August due to extreme fire conditions. Snow often closes all or portions of the trail system during winter months.

Approximately 23 percent of the EFR route miles (28 of the approximately 128 miles) located within the Opine planning area boundaries are shared use roads.

Approximately 30 percent of the users of the EFR trail system use class I OHVs (quads or three wheelers). With the exception of two difficult trails through the lava, all trails are maintained to accommodate this type of OHV.

The trail system permits the use of the trails by other users including hikers, mountain bikers, and horseback riders. EFR has hosted non-motorized events; they typically have not obtained permits so there is little information available on these events.

Adjacent to the planning area to the north, the Prineville District of the BLM manages the Millican Valley OHV trail system located north of the planning area. The South Millican portion of this system is located immediate north of the forest boundary. It contains approximately 43 miles of trails and shared use roads (designated roads that permit the operation of non-street legal OHVs). This area has a December 1st to July 31st seasonal closure for sage grouse and deer winter range habitat. The area is also often closed by

extreme fire conditions during the same period as EFR. There is little variation in terrain and when open, riding conditions are often poor with sandy, dusty soils and hot temperatures. This area gets little use.

OHV use on BLM managed lands east of the planning area is limited to existing roads and trails. From the planning area, access to these lands often requires access through adjacent private lands. Neither the Forest Service nor the BLM has an easement across those private lands.

There is one designated class II OHV area located within the planning area, Ground Hog Rock Crawl/ Play Area. Class II OHVs, OHVs greater than 50 inches in width that also includes Jeeps, 4x4, and other similar vehicles, are currently not permitted on trails in the EFR system. They are also prohibited from cross-country travel within the trail system area. Street legal class II OHVs are allowed on all open forest system roads. Non-street legal class II OHVs are allowed on maintenance level 1 and 2 roads.

Much of the land managed by the Deschutes National Forest is open to motorized cross-country travel, including travel by OHVs. This includes the approximately 28,647 acres of the planning area outside of the EFR trail system area. OHV use follows state law with regards to travel on roads. Under Oregon State law, roads that are not maintained for passenger cars are the only roads that non-street legal OHVs can legally ride on unless specifically designated as a shared use road. On lands managed by the Deschutes National Forest, this includes maintenance level 1 and 2 roads only. Street legal OHVs may legally travel all system roads if registered and licensed by the State of Oregon. This means that all classes of non-street legal OHVs are restricted to maintenance level 1 and 2 roads; street legal OHVs (classes II and III) are permitted to drive all open system roads.

There are an estimated 115 dispersed sites within the planning area boundaries. Many started as hunting camps and continue to be used as such. They also are utilized by OHV riders and other recreationists. At least some of these camps are located within or adjacent to the EFR trail system and have legal OHV access to the trail system. The Sand Springs Campground is also located within the boundaries of the EFR system. It has trail access, but is not considered an OHV campground. It is not developed; there are no camp pads or roads.

There are an unknown number of non-designated trails and roads in the planning area. The best estimate, based on local knowledge and photo-interpretation from aerial photos and orthophotos, is that there are a minimum of 29 miles of non-designated routes within the planning area. This is at best a conservative estimate as many routes are too narrow to be visible on aerial or orthophotos. Additionally, new routes continue to appear each year. Within the EFR system, these routes are illegal and are closed to use as soon as possible. The majority of existing non-designated routes are located outside of the EFR area. Figures 3-7 through 3-9 illustrate unauthorized trails within the EFR trail system area. Figures 3-10 through 3-13 show existing non-designated trails located outside of the EFR system area, but within the boundaries of the planning area. These sites include locations on Pine Mountain, Mahogany Butte, and in the Sand Springs area.

**Figure 3-7 Unauthorized OHV Trail, EFR Trail System Area. Designated route is in the upper left of the picture. Unauthorized trails are located in the upper right and center of the picture. Center trail also illustrates soil impacts - displacement, rutting, erosion – due to lack of maintenance (USDA Forest Service).**

**Figure 3-8 Same unauthorized trail (Figure 3-6) looking toward the top of the hill. Notice the depth of soil displacement and the loss of vegetation and the expansion of the trail tread from use (USDA Forest Service).**

**Figure 3-9 Unauthorized OHV trail in the EFR trail system area illustrating impacts to soils and vegetation (USDA Forest Service).**

**Figure 3-10 Non-designated OHV Route on the Westside of Pine Mountain. Route was previously closed but has continued to receive use (USDA Forest Service).**

**Figure 3-11 OHV Trails on Pine Mountain Between Road 2300-120 and Road 2017 (left) and between 2300-080 and 2300-100 (right) (USDA Forest Service).**

**Figure 3-12 OHV Trail on Mahogany Butte in the Southeastern Portion of the Opine Planning Area. This is a 2-track trail typical of Class II OHVs (USDA Forest Service).**

**Figure 3-13 Off Road Activity, Sand Springs Area (USDA Forest Service)**

***East Fort Rock OHV Area***
**Alternative 1:** There would be no change to the existing use or use patterns within the EVR OHV area.

**Alternatives 2 and 3:** Alternatives 2 and 3 propose vegetation treatments within and adjacent to designated OHV routes within the boundaries of the EFR OHV area. All or portions of those route segments would be signed and closed during management activities to minimize or eliminate conflicts between trail users and equipment or burning operations. Trailheads and/or staging areas located adjacent to treatment units may also be closed to minimize or eliminate the risk of conflicts between users and equipment or burning activities. Such closures may result in moving users to other locations or result in an increase in unauthorized use including riding in closed areas, riding off designated routes, or other non-designated activities.

Management activities such as timber harvest that utilize heavy equipment may result in damage to designated trails, trailheads, staging areas, and other facilities or structures (signs, barriers, etc.). Equipment may damage the trail tread, damage or destroy drainage structures, remove vegetation or forest debris that prevents travel off the designated trail, increase trail width, and provide access to trails by standard 4-wheel drive vehicles that are not permitted on existing trails. Slash can block trails, trailheads, and staging areas. Mitigation measures for this project (OHV Report pages 7-8) would reduce or eliminate these impacts under both alternatives.

Equipment, falling trees, and burning can damage or destroy signs, barriers, fences, and other facilities and infrastructure. Mitigation measures would minimize the risk that management activities would result in significant damage to existing facilities under both action alternatives. This would include the repair or

replacement of damaged facilities, infrastructure, and trail segments upon completion of management activities.

In addition to the use of heavy equipment, reopening closed roads, constructing new roads and the construction of fire line can encourage motorized use off designated routes. Riders may become confused and/or lost where heavy equipment has obliterated designated trails. New routes created by equipment may look like a trail and further confuse riders. They may also pique the rider's curiosity and encourage riding off or outside of designated routes. Mitigation measures identified in OHV Report would eliminate or reduce the risk of riders riding off of designated routes.

Vegetation and fuel reduction treatments that reduce or eliminate existing vegetation from areas adjacent to trails could lead riders to cut corners, increase the use of trails by full-sized 4-wheel drive vehicles, and reduce the "forest feel" of the trail. Removal of vegetation and/or debris would change the curvilinear layout of the East Fort area resulting in straighter trails and faster which in turn reduces rider safety and increases maintenance needs and costs. Mitigation measures to maintain vegetation and/or forest debris along designated trails would minimize the risk of these events occurring. Where activities resulted in the loss of existing vegetation and/or forest debris, slash materials and/or other forest debris would be relocated to reduce the risk and potential of travel off of the designated trail.

Vegetation and fuel reduction treatments adjacent to or within learners' loops are of particular concern. These trails tend to be windy by nature and utilize existing thickets of vegetation to provide definition to the trail. Reducing vegetation along such trails drastically reduces its effectiveness. Mitigation measures, specifically excluding both vegetation and fuel reduction treatments from within these areas, would reduce the risk of the trail integrity being compromised by either vegetation or fuel reduction treatments by retaining most or all of the existing vegetation and/or forest debris (units F23 (both alternatives) and P19 (Alternative 2) and C324 (Alternative 3).

Vegetation and fuel reduction treatments within or adjacent to trailheads and staging areas increase the risk and potential to reduce the aesthetics of the area as well as the potential for riders to create new trails out from the trailhead and/or staging area. Implementation of the mitigation measures that retain vegetation and forest debris help to retain aesthetics of these areas as well as helping to reduce the risk and potential of new trails being created. When vegetation or existing forest debris is lost as a result of management activities, replacement using slash or other native materials from the area that were disturbed or displaced by management activities would also help to reduce the risk and potential for new trails to be created. It would also help to restore pre-treatment aesthetic values more quickly.

**Closure and Decommissioning of Roads**

**Alternatives 2 and 3:** The closure and decommissioning of roads within the boundaries of the EFR OHV area would not have any direct or indirect effects on non-street legal OHV use in the area. None of the roads proposed for closure or decommissioning under either alternative in this area is currently a designated route or trail open to OHV use. There would be no change in the number of miles of shared use roads open to OHV use under either alternative. Street legal OHVs would continue to be restricted to open system roads with only street legal class III (motorcycles) OHVs continuing to use the designated trails.

A seasonal closure of roads and motorized trails would be implemented in the MA-7 land allocation under Alternative 3, but not under Alternative 2. A seasonal closure of roads and motorized trails for the period from December 1st through March 31st of the following year in deer winter range areas would, in most years, have no measurable effect on OHV use in those areas under either alternative because snow often precludes use in those areas.

Implementation of proposed vegetation and fuel reduction treatments within the EFR boundaries would be expected to result in no directly measurable change in OHV use or use patterns under either alternative because such use is already restricted to designated routes (roads and trails). Removal of vegetation or other natural forest debris that currently limits or prevents off-route travel would be expected to result in at least some increase unauthorized use such as traveling off designated routes. This risk would be minimized by implementing the mitigation measures that retain existing vegetation and forest debris or replace vegetation and/or debris with suitable native materials upon completion of management activities.

***Opine Outside of EFR OHV Area***
**Alternative 1:** There would be no change to the existing use or use patterns within the EVR OHV area.

**Alternatives 2 and 3:** Outside of the EFR area, there are no designated routes (roads or trails), facilities, structures, or infrastructure specifically dedicated to OHV activities. Therefore, vegetation management and fuel reduction treatments proposed under Alternatives 2 and 3 would have no direct or indirect these types of improvements or infrastructure.

Closures imposed during periods of management activities would likely eliminate motorized use in areas beyond the closure and could potentially trap or otherwise isolate users and not allow them legal access to legal roads. This could be reasonably expected to result in an increase in unauthorized use, particularly cross-country travel or riding on undesignated roads or trails, during periods of closure.

The closure and decommissioning of system roads outside of the EFR system would impact motorized use and activity in this area. All the roads proposed for closure and decommissioning under both Alternatives 2 and 3 are maintenance level 2 roads. The identified road segments are, in general, short, dead-end segments that provide no through access or are connectors that are duplicated by other roads providing access to the same area. Non-street legal OHVs are expected to feel the brunt of these closures and decommissioning because these are the classes of road that is open to this group of OHVs outside of shared use roads. There are currently no shared use roads identified in this portion of the planning area and none are proposed under either action alternative.

A December 1st through March 31st seasonal closure of roads and motorized trails in the MA-7 land allocation would be implemented under Alternative 3, but not Alternative 2. The expected impacts on OHV use would be similar to that described under the EFR OHV area discussion under both alternatives.

Implementation of vegetation and fuel treatments in the area outside of the EFR OHV area would be expected to result in an increase in OHV use. Burning or mowing dense brush fields that currently limit or prevent OHV use has the potential of opening new areas to such use. Of particular concern would be the development of new hill climbs that increase the amount of exposed soils and subsequent erosion. The risk and potential is also reduced under both alternatives through the implementation of the mitigation measures.

**Socio-Economic**
**Alternative 1:** There would be no change to the existing use of the project area.

**Alternatives 2 and 3:** There is no available information that indicates the level of OHV use in this portion of the planning area so it is impossible to determine how many users would be affected by the area closure. The presence of non-designated roads and trails coupled with communications between riders and the District OHV specialists suggests that this portion of the planning area is used and that those users would be displaced to other areas that lack restrictions. Although some users would likely move to designated areas such as EFR, others would be expected to move to areas further to the south

and/or east where areas are open to OHV use. These users seek a dispersed recreational opportunity that they would not find in an area such as EFR.

Displacement of users that wish to travel cross-country would be expected to put more of them into increasingly smaller areas. This would be expected to result in greater impacts in those areas that remain open to such use.

**Cumulative Effects**

**Alternative 1, 2, and 3:** OHV use would continue in the EFR OHV area. Use levels would be expected to continue to increase regardless of the alternative selected.

Vegetation management and fuel treatment activities similar to those being proposed in the Opine area are being completed in the Fuzzy Planning Area to the northwest of the Opine area. Fuel treatments similar to those in Opine are being implemented in the Aspen Planning Area to the south of Opine. Portions of the EFR system are located within the Fuzzy planning area boundaries. Effects of treatments on OHV use and facilities in the Fuzzy planning area were similar to those described in this analysis for both the EFR portion and the open areas outside of EFR.

No portion of the EFR system is located within the boundaries of the Aspen planning so there are no cumulative effects associated within those activities on OHV use in the EFR system. Cumulative impacts of fuel reduction treatments in the Aspen planning area on other motorized use, including OHV activity, would be similar to that described for the Opine planning area outside of the EFR system.

If Alternative 1, 2, or 3 is implemented, there would be no measurable, short-term, cumulative impact associated with the proposed changes. Unless policy or regulations change, motorized cross country travel and travel of existing roads would continue and follow current laws and regulations.

The initial Opine proposal included a proposal to establish a designated OHV trail system on Pine Mountain. When the initial project was divided into three separate analyses, all access related activities, including motorized and non-motorized trail development were included in a proposed access management analysis. Time and monetary constraints forced this effort to be dropped.

Comments received during the 30 day comment period for this assessment resulted in the revival of the proposal to establish a designated OHV trail on Pine Mountain. This proposal utilizes existing system roads and non-designated trails that were identified for inclusion during the analysis process for the proposed access management EA. The primary difference between the original proposal and this new proposal is the type of OHVs that would be permitted on the designated trail. Under the original proposal, the designated trail system was to be for class I and III OHVs, under the new proposal, the designated system would be restricted to class II OHV only. No class I or III vehicles would be permitted. This designated trail would be implemented regardless of the alternative selected for this project.

Under Alternatives 1, 2, and 3 there would be no cumulative impact of designating this trail system beyond that already described. With the exception of the seasonal deer winter range closure existing motorized travel would continue with the only difference being that class I and III OHVs, both street legal and non-street legal, would not be permitted on this designated route. This would eliminate three (3) current access routes to the top of Pine Mountain for those classes of OHVs. Realistically, this would be likely to result in the at least some additional non-designated routes to the top of Pine Mountain for those classes of OHVs.

## Range

***Existing Condition:*** The LRMP permits livestock grazing in the planning area including in the MA-7 deer habitat allocation, stating "Livestock grazing, both sheep and cattle would be permitted with associated range improvements such as fences and water developments (page 4-113)." Levels of use are tiered to the need to provide for winter habitat for mule deer including available browse. Standard and guideline M7-8 states "Forage utilization by livestock would be maintained at a level so that sufficient forage is available to support the desired number of deer. Grazing systems … would be designed to be compatible with or complementary to the habitat management objective (LRMP page 4-114)." Grazing systems are designed to be compatible with and operate within these guidelines.

All or portions of three allotments are contained within the Opine planning boundary: Cinder Cone, Pine Mountain, and Sand Springs. All three are currently active. All three are cattle allotments. The Cinder Cone and Sand Springs Allotments are designed to operate at the upper limit of 600 cow/calf pairs and the Pine Mountain Allotment at the upper limit of 500 cow/calf pairs. More complete discussions of the specific allotments are found in the Range report (pages 18-23).

An environmental assessment was completed for the Cinder Cone and Pine Mountain Allotments in 2005. Current allotment management plans (AMPs) were approved in 2006 for these allotments. An Environmental Assessment was completed for the Sand Springs Allotment in 2006. The Sand Springs allotment management plan dates from 1984; it is likely to be updated later in 2007.

Cattle are primarily grazers as opposed to browsers, favoring grass species whenever available, but will utilize bitterbrush when grasses are limited or unavailable. Use of bitterbrush by cattle is minimized by grazing after grasses and forbs green up in the spring (generally May 1 to May 15) and before they go completely dormant in the fall (generally September 15 to October 1).

Both AMPs and the Condition and Trend Analysis Plots (CT Plots) indicate that the forage condition is generally good, and the vegetative trend stable. Additional information regarding these plots, the methods of data collection and analysis, trends, and a complete discussion of monitoring results can be found in Appendix 2 of the Range Report (pages 69-127). Forest-wide Standard and Guideline (S&G) RG-13(D) suggests a maximum utilization of 50 percent of annual shrub production by livestock and big game within primary range areas (LRMP, page 4-50). In the MA-7 land allocation, S&G M7-8 requires forage utilization by livestock to be maintained at a level so that sufficient forage is available to support the desired number of deer (LRMP, page 4-114).

Monitoring has shown that areas where resource impacts appear to have been caused by livestock are water set locations, water haul roads, and resting or bedding areas. These areas contain compacted soils and less diverse plant communities (occasionally, dominated by cheatgrass). Impacted areas are estimated to be less than 0.07 percent of the total planning area (Range Report page 2).

Tables 2A-2C in the Range Report (pages 3-15) display the type, location, and number or quantity of range improvements located within the planning area.

***Environmental Effects*: Alternative 1**

Under Alternative 1, existing vegetation would continue to move toward a landscape dominated by mature shrubs and forest stands. Disturbance that would disrupt this pattern would be limited to large scale, high intensity stand replacement fires and insect attack. Over the long-term, multiple decades, this would result in the decline in the quantity, quality, and distribution of forage and browse species desired by both domestic livestock and wildlife. In forested areas, this would result in declines in Idaho fescue, important for livestock forage, and in bitterbrush, important winter browse for mule deer.

Conversion of existing shrub and grass communities to forest would continue with continuing encroachment by western juniper and ponderosa pine. In sites dominated by juniper, this would also lead to decreased ground cover and reduced plant diversity. This would lead to increased levels of exposed soils and increased levels of soil loss due to wind and water erosion. There would also be a greater degree of competition for water between juniper and other plant species (Range Report page 44). Experience indicates that under certain conditions during the summer season, juniper become highly flammable. The increasing juniper component would increase on-site fuel loading and subsequent wildfire intensity should a wildfire occur.

The quantity, quality, and distribution of browse for wildlife would not change in the short-term assuming no major disturbance such as a fire.

There would be no direct or indirect effects on existing grazing operations. Use of allotments or pastures within allotments would not be restricted or prohibited because of vegetation and/or fuel reduction treatments. Seasons of grazing and stocking levels would not need to be adjusted. Alternative grazing sites to replace those closed or restricted due to management activities would not be required. Existing improvements such as fences and water sets would not be damaged and therefore there would no need for additional repair or replacement.

Permittees would experience no changes in access as no roads would be closed or decommissioned.

Management activities such as timber harvest and fuel reduction activities, as well as natural events such as wildfires, alter forage production on sites where these activities are located. Such activities or events provide often significant increases in forage quantities for periods ranging from two (2) to 20 years. This is considered as "transitional" range for livestock; in forested east-side vegetative communities, this is a significant element (Range Report page 44). The development of transitional range would be limited to wildfires only and therefore limited in quantity, timing and distribution.

None of the sale area improvement projects proposed under the proposed action would be implemented under this alternative. Conflicts between OHV uses, dispersed camping, and livestock operations would continue. Vandalism at the trick tank on West Pine Mountain would also be expected to continue. No wildlife friendly fences would be constructed along the northern boundary on Pine Mountain, which would continue to cause problems for wildlife movement, particularly deer. Existing unneeded fence lines would not be removed.

**Alternatives 2 and 3**

Alternatives 2 and 3 would reduce fuel loadings and subsequent wildfire intensity on 507 and 235 acres respectively by removing encroaching juniper and pine from historic and existing shrub and grass communities. In addition to the reduction in fuel loadings and subsequent wildfire intensity, the removal of these trees would also reduce the amount and distribution of bare soil, reduce the exposure and loss of soil to wind, and help to maintain or improve vegetative diversity. These treatments would retard progression to a forested type – pine or juniper – for approximately 30 years (Range Report, page 43).

The hand falling of juniper and pine would be expected to have limited and localized impacts on existing vegetation. Some, particularly shrub species, may be damaged by falling trees. Others, including shrubs, forbs, and grasses, may be shaded for a period of time by slash. In both instances, this may result in a decline in the quantity of forage and browse available for livestock and wildlife. These impacts would be expected to be short-term, less than five (5) years, in duration.

In addition to the removal of encroaching trees, approximately 60 percent of Unit R1B would also be mowed under both alternatives. Mowing would target manzanita, a species not highly palatable to either big game or livestock. This would result in increasing the availability of light, nutrients, water, and space for the establishment and growth of grass, forb, and shrub species that would provide additional and/or improved forage and browse for both livestock and wildlife. This treatment would also reduce existing fuel loading and fire intensity should a wildfire occur within the treatment unit. It is expected that this treatment would remain effective, i.e. provide quality forage and browse, and reduce fuel loading, for approximately 30 years when retreatment would again be necessary (Range Report, page 44).

Units R2A and R2B would not be treated under Alternative 3, a reduction of approximately 272 acres. Those acres would continue to experience encroachment by juniper and pine resulting continuing reductions in the quantity, quality, and distribution of forage for livestock and forage and browse for wildlife. The process of conversion of these areas from shrub and shrub-grass to forest communities would continue with the resultant impacts as described under Alternative 1.

Implementation of management actions such as mowing, prescribe burning, and timber harvest would, under both alternatives, maintain or increase the amount of transitional range available for livestock. Although management actions, particularly wildfire and to a more limited extent, mowing, reduce the quantity and distribution of bitterbrush for wildlife, these actions tend to favor increases in grasses and other herbaceous vegetation favored by livestock. This can assist in reducing the risk and impact of cattle browsing bitterbrush and making more of this limited resource available for mule deer (Range Report page 44).

If two or more pastures within a given allotment are treated within the same or succeeding years, permittees may experience large economic impacts. To avoid economic impacts to permittees within any given allotment the fire/fuels and range program managers will develop a vegetation management implementation plan that would direct activities to treat only one pasture of each active allotment within the project area in a given grazing season (see Mitigation Measures/Range).

The treatment of large areas or multiple units within a given allotment within a short time period may result in eliminating the need to rest one or more of the pastures. Such treatments may not adversely or significantly alter livestock distribution patterns. Distribution patterns under such an implementation strategy may improve when compared to an implementation strategy that schedules treatments on small areas over longer periods of time (Range Report, page 47).

Mowing would result in fewer impacts to grazing operations than fire. Treated areas would not require a post-treatment rest. Grazing could be resumed immediately upon completion of the mowing.

Similarly, vegetation treatment units, including both commercial and non-commercial harvest, would also restrict or prohibit grazing only during periods of operation, including post-harvest slash treatment. Impacts could be further reduced by careful coordination of operations and the scheduling of grazing under the rest rotation grazing system. Vegetation treatment units that include follow-up fuel reduction treatments using prescribe fire could also require one or more grazing seasons of rest. No treatment units have been identified under either alternative that would require post-treatment rest.
Some fuel reduction units proposed in Alternative 2 would treat areas previously treated to reduce fuel loadings. Within these retreatment areas, new treatments would be expected to result in the reduction in the quantity, quality, and distribution of shrubs while increasing the quantity, quality, and distribution of grasses and forbs. Big game would lose browse and livestock would gain forage. Retreatments would also delay the recovery of the shrub component and extend the time during which forage quality, quantity, and distribution would remain high. With the increased forage availability, it is expected that

competition for browse, particularly bitterbrush, between livestock and deer, would decline. Under Alternative 3, no previously treated areas would be treated unless a review showed retreatment was necessary. Recovery of shrubs would continue unabated in those areas. The quality, quantity, and distribution of forage species would slowly decline. Competition between livestock and deer for shrubs, particularly bitterbrush would remain and increase as forage quality and availability in these areas declined.

Road closures and decommissioning would have little or no measurable impacts on grazing or grazing operations under either Alternative 2 or 3. Roads proposed for closure or decommissioning does not currently provide access to existing water sets or other grazing facilities under Alternative 2. Under Alternative 3, four (4) roads (2300-080, 2017-400, 2017-540, and 2017-543) are proposed for decommissioning. All four roads provide access to water sets, CT plots, and/or other range improvements such as fences. One, 2017-540, is also used as a cattle driveway to move cattle between the west side of Pine Mountain to the top. Two of the roads, 2017-400 and 2300-080, are proposed for designation as a designated class II OHV trail under a separate analysis and decision. Both provide access to water sets and/or CT plots. Use by the permittee would continue upon decommissioning and designation under the terms and conditions of the grazing permit. Some access to portions of existing fence lines may be lost. Permittees do have alternative means of accessing any fence segments that become less accessible due to road closures or decommissioning including the use of horses or OHVs.

Possible conflicts between grazing and vegetation and fuel reduction treatments may occur where these operations occupy common sites under both alternatives. Gates controlling livestock movement could be left open. Fences could be cut, damaged, or destroyed. Water haul to water sets could become more difficult with increased traffic levels on roads or due to reduced visibility associated with dust or smoke. Accidents between livestock and vehicles may increase. Livestock use patterns may also be affected. Conflicts would be reduced under both alternatives by implementation of the mitigation measures outlined in Chapter 2. Protecting improvements, signing and closing roads, and coordination with both the district range management specialist and affected permittees would serve to minimize the conflicts. Improvements damaged or destroyed during management activities would be repaired or replaced by the contractor, or in the case of Forest Service actions, by the district. Tables 5-7 (pages 49-56) and Table 8 (pages 57-63) in the Range Report identify the specific improvements, trend plots, and roads important to grazing operations for Alternatives 2 and 3 respectively. There are not expected to be any measurable effects of implementation, except when operations are occurring.

The several sale area improvement range projects identified for both action alternatives could be implemented assuming money is available. The road to the trick tank on West Pine Mountain would be gated thereby reducing vandalism. Conflicts between dispersed campers, OHV users, and livestock would be reduced at the water set adjacent to Road 2017 by the construction of a fence. New wildlife friendly fences, constructed along the northern side of Pine Mountain would improve the movement and safety of wildlife. The removal of unnecessary fence lines would also serve to improve the movement and safety and wildlife.

Management actions, particularly fuel reduction treatments and vegetation management activities such as timber harvest, would provide a net benefit to grazing and grazing operations within the planning area. Such actions alter forage production on treated sites with often dramatic increases in forage production for periods ranging from two (2) to 20 years depending upon the site, specific management actions, and the implementation schedule.

***Cumulative Effects***

Grazing in the Cinder Cone and Pine Mountain Allotments was reauthorized in the decision notice for the Cinder Hill Range Analysis Environmental Assessment (2004). Actions authorized by that decision would have no measurable cumulative effects under any of the three alternatives considered under this analysis.

Treatments would reduce the amount of antelope bitterbrush available in the project area. Adherence to utilization standards is expected to minimize the risk of livestock browsing bitterbrush thereby maintaining more browse for deer. Grazing would be infrequent and used mainly for vegetation management. Grazing will reduce the amount of "flashy fuels" that could influence the increase and size and spread of wildfires.

Livestock may utilize existing roads for travel. Livestock and vehicles using the same routes can cause vehicle damage, personal injury, and injury to livestock

Road closures, and a designated off highway vehicle (OHV) trail system within the planning area may: 1) increase the human/livestock interaction; 2) require the relocation of an existing water set; 3) concentrate compaction in new areas of new water sets; 4) increase fence line maintenance; and 5) decrease permittee access.

Livestock "water set" areas are often popular camping locations, creating dual use areas, which may be compatible as long as they occur at separate times. Water sets would continue to be utilized by recreational visitors when not being used for grazing operations. Expansion of water sets, because of recreational use, would not have a measurable impact on forage production or soil compaction. Water sets currently occupy less than one tenth of one percent (0.1 percent) of each allotment and the project area. Increasing the size of the area by 10 feet in all directions would result in an increase of impacted area to approximately 1.2 acres, an increase of approximately 17 percent per site, effectively eliminating the forage production in these impacted areas. These areas, that have soil and vegetative disturbance, also frequently have populations of invasive species of vegetation associated with the disturbed sites.
Alternative 1 provides the least benefit to permittees because no fuel reduction or vegetation treatments would be implemented that would provide increased forage for livestock and help to reduce competition for bitterbrush. Alternative 2, because if provides the greatest number of acres of fuel reduction and vegetation treatments, provides the greatest benefit to the permittees, and Alternative 3 following.

Neither of the action alternatives would threaten a violation of any federal, state, or local law or requirements imposed for the protection of the environment. The proposed action is consistent with the LRMP goals and standards for range and the objectives of the LRMP management allocations. There would be no measurable cumulative impacts to grazing in the planning area from any of the action alternatives. Grazing will continue under any alternative selected.

## Recreation

***Environmental* Effects**

**Alternative 1 -** Under Alternative 1, developed recreation activity levels (developed camping and day use activities) would be expected to experience a slow but limited increase. This increase is primarily associated with the increased interest in the Pine Mountain Observatory. Observatory visitors, especially those attending summer weekend stargazing activities, use the Pine Mountain Campground across from the observatory. The Sand Springs Campground, although technically a developed site, has limited and primitive development. It is currently managed as a developed-dispersed site. No changes in the level of use are projected.

There would be no changes in current management practices and policies relative to dispersed recreation activities. In the short-term, dispersed recreational opportunities would remain relatively unchanged. Access to existing dispersed sites would be maintained as no roads would be closed or decommissioned. Existing system roads and non-designated trails would continue to be utilized for both motorized and non-motorized access. The existing approximately 115 dispersed sites would remain open. With continued access, new dispersed sites are likely to continue to be developed and some existing sites are likely to expand in size. The development of new sites and the expansion of existing sites would increase the level of degraded soils due to the loss of vegetation, compaction, and increases in erosion rates from both wind and water. Additionally, the creation of new dispersed sites would be expected to result in the number of "seen" camps from other areas thereby changing the quality of the experience and decreasing the scenic value in those areas. Given past and present use patterns and the location of the project area, this increase in dispersed sites is likely to occur at a relatively slow pace and over a long period of time (multiple decades).

Alternative 1 would have no measurable direct or indirect effect on hang and paragliding activities that currently occur on Pine Mountain. The risk of wildfire would remain, potentially reducing or eliminating access during periods of high fire danger or during fire events. The existing access roads to the primary launch sites on the north side of Pine Mountain, FR2017-300 and 2017-350 would remain open and unimproved.

Many of the dispersed sites in the planning area are utilized by OHV users. This use often results in the creation of additional non-designated trails as riders attempt to connect to established trails or access other areas. This would likely continue throughout the planning area as motorized cross-country travel would not be prohibited. Although prohibited within the EFR OHV area, the same activity occurs but at a reduced rate.

**Alternatives 2 and 3** use levels associated with developed camping and day use activities would continue to slightly increase above current levels. Although at least some of this increase is due to the increasing popularity of the observatory and its summer weekend programs, part of the increase is likely to occur because road closures and decommissioning would make existing dispersed sites inaccessible to motorized vehicles. At least some of the displaced users would be expected to utilize either the Sand Springs or Pine Mountain Campgrounds.

Table 3-27 displays the developed and known undeveloped (dispersed) sites that are located in or are immediately adjacent to proposed treatment units by alternative. It does not contain dispersed sites not affected by proposed treatments. Although it reflects the most current available information, it likely does not contain all the sites that may be located within or immediately adjacent to proposed treatment units.

**Table 3-27 Developed and Dispersed Recreation Sites within or adjacent to Treatment Units by Geographic Area and Alternative.**

| Treatment Type | Geographic Area | Treatment Unit & Recreation Site Type | |
|---|---|---|---|
| | | Alternative 2 | Alternative 3 |

| Treatment Type | Geographic Area | Treatment Unit & Recreation Site Type | |
|---|---|---|---|
| | | Alternative 2 | Alternative 3 |
| Vegetation | Pine Mountain | Unit 04 – 1 dispersed campsite<br>Unit SD08 – 3-4 dispersed campsites<br>Unit P09 – 3 dispersed campsites<br>Unit P10 – Pine Mountain CG | Unit C303 – 1 dispersed campsite<br>Unit C304 – 1 dispersed campsite<br>Unit C307 – 2 dispersed campsites<br>Unit C308 – 1 dispersed campsite<br>Unit P304 – 1 dispersed campsite<br>Unit P309 – encompasses a large portion of a hang glider launch site<br>Unit P315 – 2 sites<br>Unit P321 – Pine Mountain CG<br>Unit P346 – 4 dispersed campsites |
| | Sand Springs | Unit 34 – 1 dispersed campsite<br>Unit 36 – 1 dispersed campsite<br>Unit 36 – 1 dispersed campsite. | C332 – 1 dispersed campsite<br>C333 – 1 dispersed campsite<br>C334 – 1 dispersed campsite<br>P342 – 1 dispersed campsite |
| | Tepee Draw | Unit 12 – 1 dispersed campsite<br>Unit 14 – 2 dispersed campsites Unit 15 – 2 dispersed campsites<br>Unit 27 – 4 dispersed campsites<br>Unit – P15 – 1 dispersed campsite<br>Unit P18 – 3 dispersed campsites<br>Unit SD06 – 1 dispersed campsite | Unit C 309 – 1 dispersed campsites<br>Unit C315 – 1 dispersed campsite<br>Unit C325 – 3 dispersed campsites<br>Unit P333 – 1 dispersed campsite<br>Unit P334 - 3 dispersed campsites<br>Unit P339 – 2 dispersed campsites |
| | Lavacicle | Unit F32 – 2 dispersed campsites | Unit F32 – 2 dispersed campsites |
| Fuel Reduction | Pine Mountain | Unit F01 – 1 dispersed campsite<br>Unit F09 – 1 dispersed campsite<br>Unit F16 – 2 dispersed campsites along Road 2017, Pine Mountain Campground & hang glider launch site<br>Unit F17 – 2 dispersed campsites<br>Unit F18 – 1 dispersed campsite<br>Unit F37 – 1 dispersed campsite<br>Unit F38 – 1 dispersed campsite | Unit F01 – 1 dispersed campsite<br>Unit F09 – 3 dispersed campsites, portion of hang glider launch site<br>Unit F17 – 3 dispersed campsites, hang glider launch site & Pine Mountain Campground<br>Unit F18 – 1 dispersed campsite<br>Unit F35 – 5 dispersed campsites along Road 2017<br>Unit F37 – 1 dispersed Campsite<br>Unit F38 – 1 dispersed campsite |

| Treatment Type | Geographic Area | Treatment Unit & Recreation Site Type | |
|---|---|---|---|
| | | Alternative 2 | Alternative 3 |
| | Tepee Draw | Unit F03 – 4 dispersed campsites<br>Unit F05 – 3 dispersed campsite<br>Unit F13 – 13 dispersed campsites<br>Unit F15 – 1 dispersed campsite<br>Unit F20 – 1 dispersed campsite<br>Unit F21 – 17 dispersed campsites<br>Unit F25 – 1 dispersed campsite<br>Unit F26 – 1 dispersed campsite<br>Unit F28 – 2 dispersed campsites<br>Unit F29 – 5 dispersed campsites | Unit F03 – 4 dispersed campsites;<br>Unit F05 – 1 dispersed campsite<br>Unit F13 – 5 dispersed campsites Unit F15 – 1 dispersed campsite<br>Unit F20 – 1 dispersed campsite<br>Unit F21 – 17 dispersed campsites<br>Unit F25 – 1 dispersed campsite<br>Unit F26 – 1 dispersed campsite<br>Unit F29 – 5 dispersed campsites |
| | Lavacicle | Unit F32 – 2 dispersed campsites | Unit F32 – 2 dispersed campsites. |

Proposed vegetation and fuel reduction treatments would have limited short-term impacts on developed camping at the Pine Mountain Campground. Proposed vegetation and fuel reduction units surround the campground site, but no activities are proposed within the site boundaries. During periods of operation, campers would expect to see slash created during commercial and/or non-commercial harvest. This slash would be visible until the unit was underburned, probably within a year.

Fuel reduction treatments would also create slash, but treatment through either piling and burning or underburning would also likely occur within a year. Evidence of burning such as charred wood, bare soil and damaged vegetation, would be visible for several years until re-growth of vegetation obscured this evidence. Mitigation, including but not limited to cutting low stumps and rapid treatment of slash materials would minimize the duration of the most obvious signs of management activities.

Sight lines into adjacent areas, and from adjacent areas into the campground, would increase. The resultant forest stands would be more open and provide an experience that approaches that of a historic ponderosa pine forest common to Central Oregon. Both campers traveling to and from the campground, as well as other day use visitors, traveling major roads such as Roads 18, 23, 25, and 2017 would also travel through or adjacent to other proposed treatment units under both alternatives. Again, mitigation would minimize short-term impacts. Long-term, these treatments would provide a landscape more typical of the historic Central Oregon ponderosa pine forests characterized by open, single story stands of large diameter orange bark trees.

During the week, campers would experience at least some level of dust and noise under both alternatives. These impacts are more likely to affect researchers and others who utilize the observatory during the week by affecting their sleeping during the day. The duration of these impacts would be limited in duration, several days at most, given the relatively small area associated with the campground and observatory and the limited amount of treatment area proposed for activity around the campground and observatory. People using the campground on weekends would be less likely to experience noise and dust as management activities are less likely to occur during weekend days.

Both vegetation and fuel reduction treatments would be expected to affect dispersed campsites similar to those expected at Pine Mountain Campground. Application of appropriate mitigation measures would be expected to keep those impacts to a minimum. Long-term impacts would be similar to those describe for the Pine Mountain Campground.

Both alternatives propose fuel reduction treatments, specifically prescribed fire that include or are adjacent to current launch sites for hang and paragliders. Para- and hang-gliding activities would be prohibited while management activities occurred. However, impacts to such activities are expected to be limited given the relatively short window for burning that occurs during the spring and fall each year. Most hang- and paragliding activities occur on weekends when burning activities are less likely to occur. Such activities also occur later in the spring through the early to mid-fall when weather conditions are more conducive to flying. Conditions conducive to flying are also less conducive to and desirable for prescribe burning.

Road closures and decommissioning would eliminate motorized access to approximately four (4) campsites under Alternative 2 and approximately 10 campsites under Alternative 3. Closing of roads would not preclude the site from being used as neither the road or the site would be subsoiled. Access and use would require access by foot, horse, or other non-motorized means. Decommissioned roads and the associated dispersed site(s) would be subsoiled. Experience suggests that these sites would not be used in either the short or long-term.

Neither alternative proposes to close or decommission system roads that provide access to known hang and paragliding sites. None of these roads is proposed for maintenance that would improve access during periods of high fire danger when motorized access on these roads, particularly Roads 2017-300 and 2017-350, is prohibited due the presence of fine fuels (tall grasses) in and adjacent to the road prism.

The campsites where access would be changed or closed are popular with campers, OHV enthusiasts and big game hunters. Though some campers would be displaced with the proposed road closures, site access restrictions and restoration activities (i.e. subsoiling, vegetation treatments) would improve the vegetative, soil and aesthetic resources of some of the adjacent individual areas. The reduction of dispersed campsites will lead to an increase in the use and occupancy of the remaining campsites, more so for Alternative 3 due to the increased amount of proposed road closure. The existing inventory of dispersed campsites only accounts for those adjacent to system roads. Except for sites located on or adjacent to closed or decommissioned roads, the remaining approximate 100 campsites in Alternative 2 and approximately 115 campsites in Alternative 3 would continue to be accessible and usable. The potential for new sites to become established would be reduced except in areas adjacent to open system roads.

For motor vehicle campers that will be displaced from site and road closures, it's likely they would take one of the following actions:

- Utilize other existing campsites in the area.
- Develop new sites and access roads in and outside the project area.
- Camp and recreate at another location other than this area.
- Breach road closures to access campsites.

The proposed seasonal closure of the area from December 1st to March 31st of the following year would have little or measurable impact on dispersed use. During normal years, access is either limited or prohibited by snow. Access to most dispersed sites is only possible during years of limited or no snow. Use has been and is likely to remain either very low or non-existent during this period and would be limited to sites immediately adjacent to or on those roads that would remain open during this period.

The greatest impacts are expected at the Pine Mountain Campground because with the increasing popularity of the observatory during the summer months, people and livestock are more likely to occupy the same general area at the same time. It is unlikely that proposed vegetation and/or fuel

reduction treatments would occur simultaneously due to safety and liability concerns. Therefore, it is unlikely that campers would be subjected to all of these operations at the same time or even during the same season.

As recreational use is increasing in the area, the risk of accidents also would be expected to increase regardless of the alternative selected.

Expansion of the Pine Mountain Observatory permit area and the subsequent construction of new facilities are expected to result in at least some increase in the use of the Pine Mountain Campground above current rates of increase, especially when the proposed education building is completed within the next 5 to 10 years. This would be expected under all three alternatives. Although the observatory does not expect visitor numbers to exceed 5,000 per year, the number of visitors that could be accommodated for programs at one time would increase over current numbers. Due to the many programs that occur in the evening and continue or could continue late into the night or early morning hours, this is likely to correspond in an increase in the number of people using the campground. This is likely to result in the campground being filled more often.

Indirectly, the new development at the observatory may also result in an increase in dispersed use, particularly around the observatory area under all alternatives. When the Pine Mountain Campground is filled, overflow use would be expected to move to other areas. As this currently occurs with much of the overflow occurring on the flat ridgeline to the north, this pattern would be expected to continue, but with an increased frequency. Additional use would also be likely below the observatory along FR 2017.

Improvements to OHV facilities within the EFR OHV area have been proposed, including upgrades to the Sand Springs Campground, moving trails, and improvements at trailheads and staging areas. This would likely result in increased use at the Sand Springs Campground because of improved facilities as well as additional use at existing dispersed sites. Under all alternatives, such increases are also likely to result in the development of additional dispersed sites, especially outside of the OHV area. Some of this increase may be directed to sites outside of the planning area, including onto other adjacent ownerships.

**Cumulative Effects**
**Alternatives 1, 2, and 3:**
There would be no measurable cumulative impacts expected under any alternative.

## Scenic Resources

***Existing Condition:*** The north and northeast slopes of Pine Mountain visible from Highway 20, views along Forest Road 2017, and the south facing slopes of Pine Mountain below the Pine Mountain Observatory are within the MA-9 (Scenic Views) land allocation. This allocation has a Visual Quality Objective of **Partial Retention** and a Scenery Management System **Scenic Integrity Level of Moderate**. This refers to landscapes where the valued landscape character appears “slightly altered”. Noticeable deviations must remain visually subordinate to the landscape character being viewed (Scenic Resources Report page 1).

Within the old growth management allocation (MA-15), the same scenic values for preserving the landscape characteristics of large ponderosa pine in a more open forest setting should be retained (Scenic Resources Report page 1).

Maintaining unobstructed views to the night sky from the observatory is both a primary concern to those visiting and utilizing the facilities at the observatory and a priority for the future as outlined in the 20 year Master Plan developed in 2001 (Scenic Resources Report pages 1-2).

Scenery Management Objectives are defined in terms of Scenic Integrity Levels. Scenic integrity levels describe existing conditions and whether the landscape is visually perceived to be "complete" or not. The highest Scenic Integrity Level means that there is little or no deviation from the landscape character that makes it appealing and attractive to visitors and local residents. Scenic Integrity Levels also describe the level of development allowed and ways to mitigate deviations from the area's landscape character.

Usually the most effective way to meet Scenic Integrity Levels is to repeat visual form, line, color, texture, pattern, and scale common to the scenic values of the landscape character being viewed. In natural and natural appearing landscapes, deviations such as created openings can sometimes be visually enhanced through repetition of size, shape, spacing, surface color, edge effect, and pattern of natural openings common to the existing landscape character. When repetition is designed to be accurate and well placed, the deviation may blend so well that change is not evident (Scenic Resources Report page 2).

The desired future condition for the MA-9 and MA-15 land allocations is to enhance scenic views through treatments that result in a more open landscape characteristic of historic old growth forests with visible large diameter ponderosa pine.

***Environmental Effects*:** Alternative 1 would result in no measurable direct or indirect effects on scenic resources within the planning area in the short-term. There would be no measurable direct or indirect effects on scenic resources over the long-term short of changes affected by disturbance agents such as fire and insects. As a result, no short or long-term changes in the recreational experience of viewing the landscape from major roads would be expected (Scenic Resources Report page 3).

Views of the night sky from telescopes within the observatory permit boundary would be obscured over time (Scenic Resources Report page 3). No coordinated vegetation management activities would be implemented that would maintain views over the long-term, more than 10 years.

Continued unrestricted OHV use outside of the EFR OHV area would increasingly affect the quality and type of recreational experience associated with scenic resources through increasing noise, dust, and increased use (Scenic Resources Report page 3). Similar impacts would be expected within the boundaries of the EFR OHV area, but due to the restriction of OHVs to designated routes (roads and trails), the impacts would be expected to be less.

Changes in the landscape due to wildfire, and to a lesser extent, insects, could be noticeable, especially when viewed from roads (Scenic Resources Report page 3).

The desired future condition characterized by open stands of large diameter ponderosa pine would be delayed. High and increasing stand densities would continue to make stands more susceptible to stand replacement wildfires and further delaying or setting back the development of desired stand characteristics.

Under both Alternative 2 and Alternative 3, the overall pattern of the proposed treatments is to concentrate treatment in stands with higher tree densities. The treatment of smaller trees would result in the enhancement as well as protection of the larger trees. The reduction of tree densities over larger contiguous areas of the landscape versus smaller isolated treatment patches would be less visible in the views of Pine Mountain from Highway 20. This is especially true during winter months when snow on open ground visibly contrasts to the darker appearing cover of forested areas (Scenic Resources Report page 3).

Scenic views in foreground areas along Road 2017 and adjacent to campground facilities would have visible short-term impacts (less than 10 years) from proposed vegetation management and fuel treatment

activities throughout the project area (Scenic Resources Report page 3). These would include paint, flagging, and signs on trees, the presence of slash, disturbed ground associated with skidding activities and landing areas, and the presence of stumps. Proposed mitigation measures, specifically flush cutting stumps, using low impact machinery or hand piling of slash within 300 feet of recreation sites and main travel routes, locating skid trails and landings 300 feet or more from recreation sites and Road 2017, in addition to others described in the Scenic Resources Report (pages 6-7) would help to minimize both the extent and duration of those impacts.

Additionally, vegetation and fuel reduction treatments that open forest stands and shrub communities slash piles and concentrations, and burning and mowing activities may all be visible to the viewer for at least the short-term, up to five years or so. Mitigation measures such as removal of slash piles and locating landings and skid trails away from main travel corridors would help to minimize these impacts, especially if cleanup is completed within two years. Within 5 to 10 years, the visible aspects of both fuel reduction and vegetation treatment activities would become increasingly less noticeable due to natural changes across the landscape such as vegetative growth and regrowth. Improvements in forest health and reductions in the risk and intensity of large, stand replacing wildfire would also help to improve scenic quality across the landscape.

There would be no closure of the area to OHV use under Alternative 2. The effects would be the same as those described under Alternative 1. OHV use would be restricted to designated roads and trails under Alternative 3 and cross-country travel prohibited. There would be no designated OHV routes on Pine Mountain under either action alternative. This would result in reduced levels of noise and dust in addition to reduced levels of use.

The closure or decommissioning of 19 miles of system roads under Alternative 2 and 42 miles of system roads under Alternative 3 would also serve to reduce dust and noise concerns and result in improved recreational experiences associated with views from roads. Alternative 3, with the combination of road closures/decommissioning and the proposed OHV travel restrictions would result in a greater improvement because of the greater potential reduction in both noise and dust levels.

Both Alternative 2 and Alternative 3 would maintain large tree canopy cover by thinning from below. This would serve to feature the larger diameter ponderosa pine and moving treated stands toward the desired future condition. Alternative 2 would retain approximately 10 percent of each unit in an untreated condition and Alternative 3 would retain approximately 20 percent. These prescriptions would help to maintain longevity, particularly of the larger pine, on the landscape by reducing ladder fuels and stress on larger trees (Scenic Resources Report pages 4 and 5). They would also help to maintain vertical and horizontal diversity on the landscape and help to create and maintain a more naturally appearing and visually appearing landscape.

Both alternatives would meet the Visual Quality Objectives of **Partial Retention** and the Scenery Management Objectives of **Moderate Scenic Integrity** for the north and northeast slopes of Pine Mountain visible from US 20 to the north, views along FR 2017, and the south facing slopes of Pine Mountain below the observatory (Scenic Resources Report, pages 5 and 6). The resultant landscapes in these areas would appear slightly altered but the noticeable deviations would remain visually subordinate to the viewed landscape character.

Both the MA-7 and MA-8 land allocations have a scenic quality objective of **Modification** although higher levels may be prescribed. Under this objective activities may dominate the surrounding landscape but would appear natural. Created openings would be shaped and blended to the natural terrain to the extent possible. In MA-7, S&G M7-20 requires projects on high traffic volume roads to meet the **Modification** or higher objective. There is no high traffic volume roads located within the planning area

so the objective of **Modification** is the only requirement. There is no comparable S&G in the MA-8 allocation. Both action alternatives as proposed would meet the objective of **Modification**.

**Cumulative Effects -** Past fuel reduction, and to a more limited extent, timber harvest activity on Pine Mountain, has moved many existing stands toward the desired condition of open stands of large diameter ponderosa pine. Second growth stands have been thinned permitting residual trees to increase their growth and improve their health and vigor resulting in additional movement toward the desired condition in a shorter time period than would occur without such actions. Alternative 1 would provide no additional acreage; Alternatives 2 and 3 would provide additional acres of this condition in the future resulting from increased growth rates.

Approximately 300 trees are currently being removed from within the boundaries of the Pine Mountain Observatory special use permit area to restore telescope views to the lower horizon skies, reduce fuel loadings, and eliminate ladder fuels to help protect the observatory facilities, staff, and visitors from wildfire fire. No large diameter, orange barked, mature or old growth aged ponderosa pine would be removed. Coupled with continued management activities to maintain vegetative conditions within the permit area boundaries, this and future actions would have little measurable cumulative impact on scenic resources under any of the three alternatives. The current and future removals would establish and maintain more open stand characteristics and hasten the development of larger diameter trees. These actions would also help to highlight the existing mature and old growth aged trees present within the permit area and would help to maintain their presence by improving conditions that reduce the risk of an uncharacteristic wildfire and insect attack.

Construction of new facilities would result in a short-term reduction in visual quality under all alternatives that would end when the construction was completed. Approximately one (1) acre of vegetation would be removed including the removal of up to 10 trees greater than 21 inches dbh. New buildings and the resultant landscaping would be required to meet Forest Service standards including visual quality objectives. Landscaping would utilize native materials and be designed to minimize the risk of wildfire.

Planting approximately one quarter acre of pine seedlings as proposed by Alternatives 2 and 3 to screen the observatory facilities from FR 2017 would also help to maintain visual quality of the area when viewed from the road. Although visual quality would be marginally impacted during the construction of new facilities and until the planted seedlings reached a height of 5-10 feet, long-term, this “screen” would provide additional diversity and help to maintain visual integrity of the area.

Maintenance of existing utility corridors (BPA transmission lines, telephone, and powerlines) and related facilities would continue to require periodic removal of encroaching vegetation. Utility corridors are linear features on the landscape; no changes to modify them to better blend into the landscape are foreseen. There are currently no known plans or proposals to expand the width or number of existing corridors. Therefore, there would be no measurable cumulative effects.

Motorized travel during this period, cross country motorized travel would continue and would be expected to increase and also resulting in increased impacts of noise and dust. These impacts would result in declines in the quality of scenic resources during this period. A proposed designation of a Class II OHV route on Pine Mountain utilizing existing system roads and unauthorized routes would have no measurable cumulative impact under any of the three alternatives. No new construction would be required. Road 2017-405, currently overgrown with vegetation would need to be cleared, but would not require ground disturbance. This proposed project would meet the Visual Quality Objectives of **Partial Retention** and the Scenery Management Objectives of **Moderate Scenic Integrity** through successful management of this use, good trail design that prevents erosion and uncontrolled use, an on-going

maintenance program that repairs and corrects erosion problems and damage, and implements diligent monitoring of activities for resource damage and unauthorized use of undisturbed areas (Scenic Resources Report page 6).

Grazing, including the construction or reconstruction of improvements, would have no measurable cumulative or cumulatively significant effects on scenic resources under any of the three alternatives. None of the other current, on-going or reasonable and foreseeable actions has any identified cumulative effects on scenic resources under any of the three alternatives.

## Soils

### *Introduction*

The long-term sustainability of forest ecosystems depends on the productivity and hydrologic functioning of soils. Ground-disturbing management activities directly affect soil properties, which may adversely change the natural capability of soils and their potential responses to use and management. A detrimental soil condition often occurs where heavy equipment or logs displace surface organic layers or reduce soil porosity through compaction. Detrimental disturbances reduce the soils ability to supply nutrients, moisture, and air that support soil microorganisms and the growth of vegetation. The biological productivity of soils relates to the amount of surface organic matter and coarse woody debris retained or removed from affected sites.

Forest soils are considered as a non-renewable resource, as measured by human life spans, and maintenance or enhancement of soil productivity is an integral part of National Forest management. Therefore, an evaluation of the potential effects on soil productivity is essential for integrated management of forest resources (Soils Report page 4).

### *Existing Condition – Landscape Characteristics*

Approximately 70 percent of the planning area is comprised of gently sloping plains and uneven lava flows that surround Pine Mountain, a composite volcano. Pine Mountain and its associated landtypes comprise another approximately 20 percent. The remaining 10 percent is associated with miscellaneous landtypes (cinder cones, buttes and escarpments) that occur in scattered locations in the planning area. Slopes generally range from 0 to 30 percent on the dominant landforms. Steeper slopes (30 to 70 percent) are associated with the smooth-to-moderately dissected side slopes of Pine Mountain, escarpments of buttes and ridges, and a few scattered cinder cones (Soils Report page 6).

Most of the water yielded from these lands is delivered to streams as deep seepage and subsurface flows. Surface runoff generally occurs only in areas with shallow soils and disturbed sites during high intensity storms or when the ground is frozen. There are no perennial or intermittent streams within the planning area. Any channeled surface flows within ephemeral channels are discontinuous and of short duration.

With the exception of the youngest lava flows, over 90 percent of the planning area has been covered by a moderately thick layer of volcanic ash and pumice from the Mount Mazama and Newberry volcanic eruptions. These deposits consist mostly of sand-sized particles (Soils Report page 6).

Dominant soils are moderately deep (20 to 40 inches) to deep (greater than 40 inches) with loamy-sand textures and have moderate productivity potential for the growth of vegetation. The locations of proposed activity areas meet criteria for land suitability that would allow them to be regenerated or resist irreversible resource damage.

Soils derived from volcanic ash tend to be non-cohesive (loose) and have very little structural development due to the young geologic age of the ash deposits. These ash-influenced soils have naturally

low bulk densities and low compaction potential. Mechanical disturbances can still reduce soil porosity to levels that limit vegetative growth, especially where there is a lack of woody debris and surface organic matter to help cushion the weight distribution of ground-based equipment. The sandy-textured surface layers are also easily displaced by equipment operations, especially during dry moisture conditions. Soil displacement damage resulting from the maneuvering of equipment is most likely to occur on the steeper landforms.

Natural rates of surface erosion on undisturbed sites with gentle slopes are low because soils are protected by vegetation and organic litter layers. Accelerated rates of surface erosion are usually associated with disturbances or events that reduce vegetative cover, displace surface organic layers, or reduce soil porosity through compaction. Currently, soils in the planning area are adequately protected to maintain erosion rates within acceptable limits. Erosion associated with water is generally not a concern due to gentle slopes and low-to-moderate erosion hazard ratings associated with the dominant landtypes in the planning area. The low amounts of overland flow are associated the high infiltration and percolation rates typical of the sandy textures of the ash-influenced soils in the planning area. When water is channeled, particularly on disturbed sites such as road surfaces, trails, skid trails, and log landings, these soils are easily eroded (Soils Report pages 6-7).

The absence of rock fragments on the surface and within soil profiles makes these soils well suited for subsoiling treatments. These treatments loosen compacted soil layers and improve the ability of the soil to supply nutrients, moisture, and air that support vegetative growth and biotic habitat for soil organisms (Soils Report page 6).

***Existing Condition of the Soil Resource***

Natural disturbances are not included as existing sources of detrimental soil conditions. Enough time has passed since the occurrence of past wildfires that there is currently no evidence of severely burned soils and/or accelerated surface erosion within affected areas. There are no known natural or management related landslides identified or known to exist within the planning area. The coarse textured soils common to the area are highly permeable and preclude the buildup of hydraulic pressures that could trigger landslides. There are no seeps or springs on steep slopes. Landform types in the planning area do not meet the criteria for landslide prone terrain (Soils Report, pages 8-9).

Soil compaction and displacement associated with logging facilities – skid trails, log landings, and temporary roads – account for the majority of detrimental soil conditions associated with ground based logging operations. Local knowledge and experience with past and current harvest practices, research references, local monitoring reports, and field investigations were used to estimate existing soil conditions within each of the activity areas planned for this project (Soils Report page 10).

Firewood cutting, both legal and illegal, is relatively minor within the planning area, in large part due to the low quality of the wood when compared with other areas on the district. The amount of detrimentally impacted soils associated with this activity is likely accounted for in the acreage associated with logging facilities (landings and skid trails), dispersed recreation sites, and non-designated roads and trails.

The extent of detrimental soil conditions associated with recreation use, livestock grazing, and special use facilities is relatively minor in comparison to the transportation system and past logging disturbances.

It is expected that adequate amounts of coarse woody material and surface organic matter currently exist to protect mineral soil from erosion and provide nutrients for maintaining soil productivity over much of the project area.

A more complete discussion regarding the levels of detrimentally impacted soils associated with management activities can be found in following subsections (Environmental Effects, Alternative 1 and Coarse Woody Material and Surface Organic Matter) and in the Soils report on pages 9 through 13.

***Management Direction***

The Pacific Northwest Region developed soil quality standards and guidelines (FSM 2520, R6 Supplement No. 2500-98-1) that limit detrimental soil disturbances associated with management activities. This supplement requires that when initiating new projects;

1. new activities do not exceed detrimental soil conditions on more than 20 percent of an activity area including the permanent transportation system;
2. in activity areas where less than 20 percent detrimental soil impacts exist from prior activities, the cumulative amount of detrimentally disturbed soil must not exceed the 20 percent limit following project implementation and restoration; and
3. in activity areas where more than 20 percent detrimental soil conditions exist from prior activities, the cumulative detrimental effects from project implementation and restoration must, at a minimum, not exceed the conditions prior to the planned activity and should move conditions toward a net improvement in soil quality.

This guidance supplements LRMP standards and guidelines that are designed to protect or maintain soil productivity (Soils Report pages 14-15).

Detrimental soil impacts are those that meet the following criteria:

- *Detrimental Compaction* - in volcanic ash / pumice soils is an increase in soil bulk density of 20 percent, or more, over the undisturbed level;
- *Detrimental Puddling* - occurs when the depth of ruts or imprints is six inches or more;
- *Detrimental Displacement* - the removal of more than 50 percent of the A horizon from an area greater than 100 square feet, which is at least 5 feet in width;
- *Severely Burned* - when the mineral soil surface has been significantly changed in color, oxidized to a reddish color, and the next one-half inch blackened from organic matter charring by heat conducted through the top layer on an area 100 square feet or greater with a width of at least five (5) feet (Soils Report page 14).

Soils in the planning area are not susceptible to puddling damage due to their lack of plasticity and cohesion (Soils Report page 6). There is no evidence of severely burned soils from past wildfires (Soils Report page 8) or from past timber management and fuel reduction activities off of designated logging facilities (Soils Report page 11).

***Soil Productivity Issues***

Issues are used to formulate alternatives, prescribe mitigation measures, and analyze the environmental effects of management activities. Key issues were originally identified by the Interdisciplinary Team (IDT) and emphasized by the public during scoping. Soil productivity was not identified as a key issue and was not used to formulate either of the action alternatives. It is utilized to help the decision maker, the Forest Supervisor, to determine which alternative will be selected for implementation. Plans for projects must include provisions for mitigation of ground disturbances where activities are expected to cause resource damage that exceeds Regional and LRMP standards and guidelines. The soil productivity issue for the Opine planning area is:

***The proposed use of ground-based equipment can potentially increase the amount and distribution of detrimental soil conditions within the individual activity areas proposed for mechanical treatments. The removal of trees from activity areas can potentially cause adverse changes in organic matter levels.***

To measure the impacts of the proposed actions under each of the two action alternatives, or in the case of the No Action Alternative, the lack of action, the following issue measures were applied.

1) Change in extent of detrimental soil conditions following proposed harvest and mitigation treatments within the individual activity areas proposed for vegetation and fuel reduction treatments.
2) Amount of coarse woody material (CWM) and surface organic matter that would likely be retained to protect mineral soil from erosion and provide both short and long-term nutrient supplies for maintaining soil productivity on treated sites (Soils Report page 4).

***Scope of the Analysis***

The soil resource may be directly, indirectly, and cumulatively affected within each of the activity areas proposed within the project area. An activity area is defined as "the total area of ground impacted activity, and is a feasible unit for sampling and evaluating" (FSM 2520 and Forest Plan 4-71). Activity area boundaries are considered to be the smallest identified area where the potential effects of different management practices would occur. Thus, the discussion of soil effects and soil quality standards focuses primarily on the units proposed for silvicultural and fuel reduction treatments (Soils Report page 4).

Quantitative analyses and professional judgment were used to evaluate the issue measures by comparing existing conditions to the anticipated conditions which would result from implementing the action alternatives. This analysis also considered the effectiveness and probable success of implementing the management requirements, mitigation measures, and Best Management Practices (BMPs) which are designed to avoid, minimize or reduce potentially adverse impacts to soil productivity.

For the purposes of this analysis and discussion, short-term effects are defined as changes to soil properties that would generally revert to pre-existing conditions within 5 years. Long-term effects are those changes that would remain for periods of five (5) years or longer (Soils Report page 5).

***Environmental Effects***

**Alternative 1** - There would be no change in current levels of detrimental soil impacts present in the planning area. Such impacts are primarily associated with timber management activities that occurred between 1974 and 1997. During that time period, 5,248 acres were treated with a variety of silvicultural treatments. This included the construction and use of temporary roads, log landings, and primary skid roads. The amount of detrimental impacts associated with these existing logging facilities is estimated at approximately 956 acres.

This alternative would defer opportunities for soil restoration treatments that reduce the extent of existing impacts and help move conditions toward a net improvement in soil quality (Soils Report, page 22). The amount of detrimentally disturbed soil associated with existing logging facilities is included in estimated amounts of detrimental soil conditions in Table 3-28.

The planning area was originally ground-based railroad logged during the 1930s; visual evidence of logging facilities from that period is difficult to locate due to the abundance of vegetation and forest litter. The low bulk density and low compaction potential associated with volcanic ash soils has resulted in natural processes – freeze thaw cycles, revegetation, etc. – having restored or continuing to restore soil quality on these sites over time. Therefore, these impacts are not included in the estimated impacts of past activities (Soils Report page 9).

There are approximately 297 miles of system roads occupying an estimated 474 acres which have converted soils to a non-productive condition. No new roads would be constructed and no system roads would be closed or decommissioned under this alternative. There would be no change in either the number of miles of roads or the number of acres converted to a non-productive condition.

Detrimental soil conditions associated with recreation use, livestock grazing, and special use permit areas are relatively minor when compared to the current road system and logging facilities. There are 115 dispersed sites, one developed campground and approximately 100 miles of designated OHV trails. This equates to approximately 91 acres of detrimentally impacted soils. This includes 72 acres of OHV trails and associated facilities (staging areas, etc.), 16 acres associated with dispersed sites including Sand Springs Campground, approximately one (1) acre associated with the Pine Mountain Campground, and one to two (1-2) acres associated with existing or proposed facilities and infrastructure within the Pine Mountain Observatory special use permit area. There would be no change in the number of acres of detrimentally impacted soils associated with these facilities under this alternative.

An additional approximately 29 miles of non-designated roads and trails have been identified within the planning area. Assuming an average width of approximately six (6) feet, this results in approximately 21 acres of detrimentally disturbed soils. As there is currently no formal inventory of non-designated roads and trails, this is a conservative estimate of the number of miles of such roads and trails and the amount of detrimentally impacted soils. This alternative would not close any of these roads and trails. There would be no change in the number of acres of detrimentally impacted soils associated with these facilities.

There are six (6) rock or cinder pits in the planning area ranging in size from approximately one (1) to three (3) acres for a total of nine (9) acres. No changes would occur under this alternative.

Detrimental soil impacts associated with livestock grazing are primarily associated with water sets. There are 13 water sets within the planning area totaling 13 acres of detrimentally impacted soils. No changes would occur under this alternative.

**Alternatives 2 and 3 -** The level of detrimental soil impacts associated with timber harvest activity would increase under both Alternative 2 and Alternative 3. On moderately flat ground with small timber, research found that skid trail spacing of 100 feet would account for approximately 11 percent of the unit area (Soils Report, page 16). The primary skid trails are not constructed trails when the terrain is gentle to moderately sloping as in the planning area. Therefore, surface organic layers are not scraped away by equipment blades or removed off site.

The Forest average for log landings is one landing (100 feet by 100 feet) for every 10 acres of harvest. This averages approximately two (2) percent of the unit area.

Disturbed area calculations for log landings are added to the acreage estimates for main skid trails to determine the overall soil disturbance. In unmanaged portions of the proposed activity areas where slopes are less than 30 percent, the development and use of new logging facilities would result in approximately 13 percent of the harvest unit areas (11 percent in skid trails plus two (2) percent in log landings). This amount was used to analyze the proportionate extent of detrimental soil conditions which are expected to occur in unmanaged portions of activity areas proposed for mechanical harvest treatments

Soil productivity monitoring has shown that detrimental soil conditions increase each time a stand is treated with mechanical equipment (Soils Report, page 10) with the degree and intensity of impacts depending on a variety of factors including conditions prior to entry, the reuse of existing facilities such as landings and skid trails, the type of equipment and/or harvesting system used, the amount of material removed, operator experience, and contract administration. Each successive entry into a stand is expected to result in a five (5) to 10 percent increase in detrimental soils conditions with even the most careful planning and implementation of project activities (Craigg, 2000). For this analysis, an average increase of seven (7) percent in additional logging facilities was used to analyze the proportionate extent of activity areas proposed in previously managed areas.

Alternative 2 proposes approximately 146 acres of regeneration harvest (38 acres of a clearcut prescription in unit H19 and 108 acres of a shelterwood prescription in H28). Additionally both would utilize machine piling to treat the slash following harvest. The combination of mechanized harvest with machine piling would be expected to result in an increase of 15 percent in detrimental soil impacts rather than the seven (7) percent assumed in thinning prescriptions (Soils Report page 17). Therefore the analysis used 15 percent detrimental soil impacts to assess the extent of such impacts in those units. No regeneration harvest is proposed in Alternative 3.

Commercial harvest proposed under each alternative proposes to utilize a tractor mounted feller buncher equipped with a harvester head mounted on a 24 foot boom that has a 17 foot effect reach. Typically a feller buncher would be limited to a maximum of two (2) passes on a specific piece of ground. Research has shown that detrimental compaction requires 3 to 5 passes or more over the same piece of ground (Soils Report, page 10). The use of a feller buncher would be expected to result in shallow compaction, 2-4 inches in depth, and the resulting bulk density increases do not qualify as detrimental. It is expected that soils would return to pre-harvest density levels within five (5) years through natural processes such as freeze-thaw and wet-dry cycles, root penetration, frost heaving, and rodent activity.

The management requirements and mitigation measures built into Alternatives 2 and 3 are all designed to avoid or minimize potentially adverse impacts to the soil resource. Operational guidelines are included in design elements that provide options for limiting the amount of surface area covered by logging facilities and controlling equipment operations to minimize the potential for soil impacts in random locations of harvest units.

Existing logging facilities would be reutilized to the extent possible. Grapple skidders would only be allowed to operate on designated skid trails spaced on average spacing of 100 feet which results in detrimental soil impacts on approximately 11 percent of the unit area. Equipment operations would be prohibited or restricted to existing skid trails and landings in random locations of harvest units where slopes exceed 30 percent. Directional falling and requiring felled trees to be winched to the skid road would minimize or eliminate impacts on these slopes. Other requirements include limiting the amount of traffic off designated areas or operating equipment over frozen ground or a sufficient amount of compacted snow to reduce the amount and distribution of detrimental impacts, particularly displacement and compaction.

All reasonable Best Management Practices (BMPs) would be applied to minimize the effects of road systems and timber management activities on the soil resource. The BMPs are tiered to the Soil and Water Conservation Practices Handbook (FSH 2509.22) that contains conservation practices that have proven effective in protecting and maintaining soil and water resource values. The Oregon Department of Forestry evaluated more than 3,000 individual practices and determined a 98 percent compliance rate for BMP implementation, with 5 percent of these practices exceeding forest practice rules (Soils Report, page 32).

Tree planting is proposed under both alternatives; 38 acres of clearcut regeneration harvest and one quarter (0.25) acre within the boundaries of the Pine Mountain Observatory special use permit area under Alternative 2 and only the quarter acre at the observatory under Alternative 3. The use of hoedads, shovels, or other similar tools to plant and or clear slash and other materials away from the planting spot would not remove soil surface layers in large enough areas to qualify as a detrimental soil condition under FSM 2520, R-6 Supplement. Additionally, the use of vexar tubing or other conventional animal control measures used for seedling protection would not have any effect on soil productivity within planted areas. Therefore, reforestation activities would not result in an increase in detrimental soil conditions and are not included in the analysis (Soils Report page 18).

Table 3-28 summarizes current (Alternative 1), post-harvest, and post-rehabilitation detrimental soil conditions within proposed vegetation treatment units under both Alternatives 2 and 3. It does not include any detrimental soil impacts associated with fuel reduction activities outside of vegetation units or reforestation activities as described previously. These activities would be accomplished without utilizing mechanized harvest equipment, or in the case of fuel reduction units, would utilize equipment with relatively low ground pressures and require two (2) or fewer passes to accomplish the work. It does include roads, water sets, or other existing detrimentally impacted soils if those sites are included within the treatment (activity) unit boundary. Unit by unit soil conditions are described in the Tables B-1 (Alternative 2) and B-2 (Alternative 3) in Appendix B. The following discussion provides further summary discussion of the impacts of harvest activity in proposed harvest units.

**Table 3-28 Projected Levels of Detrimental Soil Impacts by Alternative Following Timber Harvest Activity and Subsoiling**

| Levels of Detrimental Soil Conditions | Alternative 2 | | | Alternative 3 | | |
|---|---|---|---|---|---|---|
| | Detrimental Soil Conditions | | | Detrimental Soil Conditions | | |
| | <=20% | >20% | Total | <=20% | >20% | Total |
| Existing Condition (Alternative 1) | 66 units 142 Ac. | 4 units 77 Ac. | 70 units 219 Ac. | 75 units 221 Ac. | 1 unit 58 Ac. | 73units 279 Ac. |
| Following Harvest | 61 units 834 Ac. | 9 units 157 Ac. | 70 units 991 Ac. | 64 units 883 Ac. | 9 units 218 Ac. | 73 units 1,101 Ac. |
| Post-Project Condition Following Subsoiling Mitigation | 67 units 867 Ac. | 3 units 66 Ac. | 70 units 933 Ac. | 72 units 1,101 Ac. | 1 units 53 Ac. | 73 units 1,154 Ac. |

The analysis indicates that, to provide access to harvest units and facilitate ground-based logging activities, Alternative 3 would result in 121 acres more soil disturbance following subsoiling mitigation than would Alternative 2.

Alternative 2 proposes harvest activities on approximately 6,480 acres. Of this total, ground-based equipment would be used in 70 harvest units totaling 6,451 acres. Approximately 29 acres in two units (units P1, P2) would be treated without the use of ground-based equipment.

Within the 70 units proposed for harvest using ground-based equipment, there are an estimated 219 acres, or approximately 3.4 percent of the proposed treatment acres, of detrimentally disturbed soil within 58 of those 70 units. This includes logging facilities from past timber management activities in addition to sites associated with other management facilities (water sets, OHV trails, etc.). This includes four (4) proposed units, H07, H38, H41, and P04, which have pre-harvest detrimental soil conditions in excess of 20 percent of the unit area (Appendix B, Table B-1). Following harvest activities, the acreage of detrimentally impacted soils would increase to approximately 991 acres, an increase of 772 acres, or approximately 15.4 percent of the harvest acres. Detrimental soil conditions would remain at or below the LRMP standard within 61 of the harvest units. Detrimental soil impacts would exceed 20 percent of the unit area in the remaining nine (9) units (H02, H07, H19, H36, H38, H40, H41, P04, and P19). Portions of 12 units would receive subsoiling treatments to rehabilitate 58 acres of detrimentally compacted soil associated with roads, log landings and main skid trails. This would include the nine units that are expected to exceed the LRMP standard plus three (3) additional activity areas (H10, H23, and H28) where short segments of existing road would be decommissioned following project activities. The analysis predicts that five (5) of the 12 units in which subsoiling would be applied would see a decrease in the area associated with detrimental soil impacts (H07, H19, H38, H41, and P04). The remaining seven

(7) units would experience an increase in detrimental soil impacts but the level would be at or below the standard of 20 percent of the unit area (Appendix B, Table B-1). This would result in the amount of detrimental soil impacts within harvest units declining to approximately 933 acres or approximately 14.5 percent of the total machine harvested acres.

Regeneration harvest prescriptions (e.g., clearcut, seed tree and shelterwood) typically require more skid trails per unit area than thinning treatments because equipment use is more intensive throughout the activity areas (Soils Report page 17). Under Alternative 2, a combination of regeneration harvest and machine piling of slash are proposed in two activity areas (38 acres of clearcut harvest in unit H19 and 108 acres of shelterwood harvest in unit H28). Impacts from machine piling operations add cumulatively to other soil disturbances caused during logging operations. It is estimated that the combined effects of these activities would cause a 15 percent increase in detrimental soil conditions. This amount was used for estimating the cumulative soil impacts for units H19 and H28 in Appendix B, Table B-1 and is reflected in Table 3-28 above.

Upon completion of all harvest and subsoiling activities, the degree of detrimental soil impacts within the 70 harvest units would range from one (1) to 28 percent with an average of 16 percent (Table A-1 Soils Report, pages 46-47). Sixty-five (65) harvest units would experience an increased level (range from 1 to 13 percent) of detrimental soil impacts above existing conditions but within the LRMP standard of 20 percent following implementation of project and restoration activities. Five (5) harvest units would result in a net improvement in soil quality ranging from two (2) to seven (7) percent: Units H07 and H19 would be at or below the 20 percent standard; Units H38, H41, and P04 would maintain existing conditions above the LRMP standard but would not exceed conditions existing prior to implementation of project and restoration activities (Soils Report, page 27).

The 29 acres that would not be treated using ground-based equipment would have no change in the amount or distribution of detrimentally impacted soils. Commercial removal of wood fiber was not considered because these units contain low volumes of commercially viable wood fiber and is not directly accessed by existing system roads, and would require temporary road construction to provide access.

Alternative 3 proposes ground-based harvest activities in 73 units totaling approximately 7,090 acres. Similar to Alternative 2, two (2) units (P301 and P302), totaling approximately 31 acres, would be treated without the use of ground-based equipment.

Within the 73 units proposed for harvest using ground-based equipment, there are an estimated 279 acres, or approximately 3.9 percent of the proposed harvest unit acres, of detrimentally disturbed soils in 65 of the 73 units. This includes logging facilities from past timber management activities in addition to sites associated with other management facilities (water sets, OHV trails, etc.). Only one (1) of those proposed units (Unit C336) currently has detrimental soil conditions that exceed 20 percent of the unit area. The analysis also concluded that the proposed harvest and skidding activities would result in a total increase of 822 acres of additional soil impacts across the 73 units (Appendix B, Table B-2). The total amount of detrimental soil conditions within the 73 activity areas would be approximately 1,101 acres prior to soil restoration activities. Detrimental soil conditions would remain at or below the LRMP standard in 64 of those units. In nine (9) units (C302, C303, C305, C308, C314, C324, C332, C336, and C339), the analysis indicates that the cumulative amount of detrimental soil conditions would exceed the 20 percent standard following harvest activities (Appendix B, Table B-2).

Portions of 12 units would receive subsoiling treatments to rehabilitate 48 acres of detrimentally compacted soil associated with roads, log landings and main skid trails. This would include the nine (9) harvest units that are expected to exceed the LRMP standard (C302, C303, C305, C308, C314, C324, C332, C336, and C339) plus three (3) additional units (P305, P317, and P321) where short segments of

existing road would be decommissioned following project activities. Unit C336, currently at 24 percent detrimental soil impacts, would, upon completion of subsoiling, experience a decrease in detrimental soil impacts of two (2) percent to 22 percent. Following subsoiling mitigation, the total amount of detrimentally disturbed soil associated with management facilities is predicted to be approximately 1,054 acres or approximately 14.9 percent of the total-machine harvested acres.

The 31 acres that would not be treated using ground-based equipment would have no change in the amount or distribution of detrimentally impacted soils. Commercial removal of wood fiber was not considered because these units contain low volumes of commercially viable wood fiber and is not directly accessed by existing system roads, and would require temporary road construction to provide access.

There is no regeneration harvest proposed under Alternative 3. There would be no machine piling of slash in random locations of any activity areas proposed for mechanical harvest under this alternative.

The analysis concludes that after project implementation, including subsoiling mitigation, detrimental soil conditions would increase above existing conditions from approximately one (1) to 13 percent within 72 of the 73 proposed activity areas (Appendix B, Table B-2). It also predicts that those conditions would continue to remain at or below the LRMP standard of 20 percent within these 72 activity areas (Soils Report, page 27). One activity area (Unit C336) would result in a two (2) percent net improvement in soil quality (less than existing conditions) following subsoiling mitigation, but detrimental soil conditions would remain above the LRMP standard at approximately 22 percent. Detrimental soil conditions upon completion of soil restoration activities would average approximately 15 percent across all units with a range of six (6) to 22 percent (Appendix B, Table B-2).

There is no significant difference between Alternatives 2 and 3 in terms of the percentage of harvested acres with detrimental soil impacts following harvest and rehabilitation activities. The number of acres with detrimental soil conditions associated with timber harvest activities totals 933 acres under Alternative 2 and 1,054 acres under Alternative 3, a difference of 121 acres. The overall percentage of detrimentally disturbed soils following all harvest and soil restoration activities is approximately 14.5 percent under Alternative 2 and approximately 14.9 percent under Alternative 3.

Although a few activity areas would exceed the 20 percent standard following project implementation, the intent for this project is to move toward and eventually meet the 20 percent standard over time. Since thinning treatments are mainly proposed for this entry, the transportation system (including main skid trails and log landings) is typically left in place so these facilities can be reused for future entries.

The harvest and restoration treatments (subsoiling) proposed in both action alternatives are consistent with Regional policy and LRMP interpretations for Forest-wide standards and guidelines SL-3 and SL-4 that limit the extent of detrimental soil conditions (Soils Report, page 27). In harvest units where less than 20 percent detrimental impacts exist from prior activities, the cumulative amount detrimentally disturbed soil would not exceed the 20 percent limit following project implementation and restoration activities. In harvest units where more than 20 percent detrimental impacts exist from prior activities (Alternative 2 – units H07, H38, H41, and P04; Alternative 3 – C336), the cumulative detrimental effects would not exceed conditions prior to the planned activity and some units would result in a net improvement in soil quality. Both action alternatives balance the goal of maintaining and/or improving soil quality following project implementation and restoration activities.

Soil restoration treatments (subsoiling) would be applied to reduce the cumulative amount of detrimentally compacted soil where post-harvest detrimental soil impacts exceed the 20 percent standard. This would include subsoiling all temporary roads and some of the primary skid trails and log landings. Road decommissioning, specifically subsoiling, of roads identified as being unneeded for future

management that enter and/or cross through harvest units would result in further reduction in the amount of compacted soils. Table B-1 (Alternative 2) and Table B-2 (Alternative 3) in Appendix B display the existing level and projected post-harvest level of detrimental soil impacts for each harvest unit under each alternative. The majority of existing and new soil impacts would be confined to known locations in heavy use areas, specifically roads, log landings and main skid trails. This facilitates where restoration treatments would need to be implemented on compacted sites. The tables also display the number of acres within each harvest unit that would be subsoiled upon completion of harvest activities and the level of detrimental soil impacts that would remain upon completion of the subsoiling. The restoration treatments are designed to promote maintenance or enhancement of soil quality, and are consistent with LRMP interpretations of standards and guidelines SL-3 and SL-4 and Regional policy (FSM 2520, R-6 Supplement). Water sets, staging areas, and other management facilities located within the boundaries of treatment units would not be subsoiled; these facilities would continue to be utilized to meet other resource needs.

Monitoring of past subsoiling activities on the Deschutes National Forest has been shown to be effective in restoring detrimentally compacted soils (Craigg, 2000, Deschutes Soil Monitoring, 1995). Dominant soils in the planning area are well suited to tillage treatments due to naturally low bulk densities and the absence of rock fragments within the soil profile. The winged subsoiling equipment used locally has been shown to lift and shatter compacted soil layers in greater than 90 percent of the compacted zone with a single equipment pass (Soils Report, pages 21 and 32). This results in the nearly complete loosening of the compacted soil particles without causing substantial displacement. Subsoiled areas are expected to reach full recovery within the short-term (five years) through natural recovery processes (Soils Report, pages 21 and 32) under both alternatives.

Although the biological significance of subsoiling is less certain, these restoration treatments likely improve subsurface habitat by restoring the soils ability to supply nutrients, moisture, and air that support soil microorganisms. Research studies on the Deschutes National Forest have shown that the composition of soil biota populations and distributions rebound back toward pre-impact conditions following subsoiling treatments on compacted skid trails and log landings (Moldenke et al., 2000).

Post-harvest fuel reduction treatments would be limited by the use of whole tree yarding. This would significantly reduce the need for post harvest mechanical fuel treatments (i.e. piling) and associated soil impacts. Machinery would only be used to pile slash in random locations of two activity areas (EA Units H19 and H28) proposed for regeneration harvest under Alternative 2. Only when previously existing woodcutter slash and/or natural dead down material are present or the post sale whipping of sub-merchantable material creates heavy fuel concentrations would mechanical piling be potentially necessary in other activity areas. Machine piling on temporary roads or main skid trails would have no effect on the overall extent of detrimentally disturbed soil because equipment would operate off the same logging facilities used during yarding operations. This fuel reduction method would not cause additional soil impacts because the piling and burning would occur on previously disturbed sites that already have detrimental soil conditions.

Within lodgepole pine and mixed pine stands, utilization of dead and down material can greatly reduce the need for mechanical piling. However, woodcutter slash and small down material has no salvage value at this time. Piling and burning the piles to break up fuel continuity would be the preferred treatment to meet fuel reduction objectives in those areas. Specialized, low-ground pressure machinery would be used to accumulate woody materials for burning them on previously disturbed sites.

Both Alternatives 2 and 3 propose fuels reduction only treatments on 20,170 acres and 10,108 acres respectively. These acres do not include commercial timber harvest. Some treatment acres include the thinning of small trees four (4) inches dbh and smaller (pretreatment) prior to follow-up treatments such

as prescribe burning and/or mowing. Other treatment acres, units R1A, R1B, R3 East, R3 West (both alternatives), R2A and R2B (Alternative 2 only) propose removal of trees to nine (9) inches dbh prior to follow-up mowing and/or burning. No detrimental soil impacts are expected from fuel reduction activities within any of the proposed treatment units under either alternative. The successful implementation of fuel reduction treatments would result in beneficial effects by reducing fuel loadings and wildfire potential. This would reduce the risk for intense ground-level fires that can result in detrimental changes to soil properties and reductions in site productivity.

Brush mowing activities would not cause detrimental soil displacement and increases in soil bulk density are inconsequential. The primary factors that determine the amount of soil compaction are the ground pressure of the tractor and mowing heads, the amount of traffic on a given portion of the ground, and the cushioning effect of surface organic matter. The use of a low-ground pressure machine, limiting travel to a single pass across a given piece of ground and the retention of at least 6 to 8 inches of vegetation after mowing minimizes the potential of measurable soil compaction or other detrimental soil disturbance. Some disturbance, primarily soil displacement, is possible when turning vehicles. The relatively small size and low weights associated with this machinery limits such disturbances to very small and isolated locations. These activities have been monitored in the past, and results show that increases in soil displacement and compaction do not meet the criteria for detrimental soil conditions (Soils Report page 19). Therefore, mowing activities would not result in a cumulative increase in the extent of detrimental soil conditions under either of the action alternatives.

Hand felling trees in portions of some fuel reduction units would not cause detrimental soil conditions because the trees would be left on site and no machinery would be used in these activity areas. At least some of the resulting slash (trees, limbs, etc.) would remain on the ground to provide surface cover and a source of nutrients as these organic materials gradually decompose. This would have beneficial effects by improving the ability of the soil to resist surface erosion and providing fine organic matter for humus development in mineral soil (Soils Report page 18).

Prescribe underburns in timber stands would be accomplished under controlled conditions, such as higher fuel moistures that minimize damage to standing trees and remove only a portion of the protective surface cover. Burn plans would comply with all applicable LRMP standards and guidelines and Best Management Practices (BMPs) prior to initiation of burn treatments (EA Chapter 2, Management Requirements). Due to moisture content of the soil surface as the most important soil property that affects the rate of heat transfer into soils at the time of ignition, soil moisture guidelines would be included in burn plans to minimize the risk for intense ground-level heating. Duff moisture levels of approximately 50 percent are typical during light intensity underburns. Soil heating during spring burns would be negligible because higher moisture levels at this time of year generally result in cooler burns with lower potential for causing severely burned soil. The time the soil is exposed is short because spring green-up soon follows precipitation events. Ground cover vegetation is expected to recover rapidly and it is not anticipated that these burn treatments would accelerate surface erosion above tolerable limits. Fall burning would be conducted following brief periods of precipitation.

Natural fuel accumulations, particularly within harvest units, consist mainly of fine fuels (i.e., decadent brush, tree branches, and needle cast litter) that typically do not burn for long duration and cause excessive soil heating. Ponderosa pine logs and existing snags would be retained to meet coarse woody material requirements for wildlife habitat and soil productivity. It is expected that adequate retention of coarse woody material and fine organic matter (duff layer) would still exist for protecting mineral soil from erosion and supplying nutrients that support the growth of vegetation and populations of soil organisms (Soils Report pages 19-20).

Prescribe burn treatments in shrub-grassland plant communities would be accomplished under similar carefully controlled conditions and would not be expected to cause severely burned soils or other detrimental soil conditions. These plant communities contain lower fuel loadings than forested sites. Prescribe burns tend to be fast moving, relatively short duration events resulting in lower soil temperatures and greater retention of existing shrubs, herbaceous ground cover, and surface organic matter. They would therefore be expected to not cause severely burned soils because of lower fuel loadings and lower soil temperatures during these fast moving burns. There would be no detrimental effects of such activities on soils under either alternative.

These activities are planned to meet fuel and visual management objectives without exposing extensive areas of bare mineral soil through the complete consumption of surface organic matter. The successful implementation of prescribed underburning treatments would likely result in beneficial effects by reducing fuel loadings and wildfire potential as well as increasing nutrient availability that benefits site productivity over larger areas of ground (Soils Report page 20).

Under Alternative 2, grapple piling and burning of woody materials is proposed in portions of four units (F28, F29, F31, and F40) totaling approximately 123 acres. Under Alternative 3, grapple piling and burning of woody materials is proposed in portions of three units (F29, F31, and F40) totaling approximately 101 acres. The overall extent of detrimental soil conditions is not expected to increase above existing levels in any of these units. The use of specialized equipment such as small backhoes with grapple arms, tracked excavators, and other low ground-pressure machines are capable of accumulating woody materials without moving appreciable amounts of topsoil into slash piles. The depth of compaction from only one or two equipment passes is expected to be shallow (2 to 4 inches) and natural processes generally offset slight-to-moderately compacted soil layers near the ground surface. Surface soils would become severely burned under the machine piles, however, these impacts would occur on existing roads, trails, or other previously disturbed sites (Soils Report page 19).

Hand piling and lopping and scattering of slash are not expected to result in an increase in the amount of detrimental soil conditions. Hand piling and burning would be used to reduce fuels by burning small concentrations of logging slash that are well-distributed within activity areas. This slash disposal method would not cause soil displacement or compaction damage. Due to the relatively small-size of hand piles, ground-level heating is usually not elevated long enough to detrimentally alter soil properties that affect long-term site productivity. These activities are conducted at times and under conditions that reduce the risk of resource damage, including impacts to soils and understory vegetation. Soil heating is reduced when the soil surface layer is moist, so piles are typically burned following periods of precipitation. Nutrient releases may actually benefit site productivity in small localized areas. The rearrangement of logging slash by the lop-and-scatter method helps protect the soil surface from erosion, and these woody materials also provide a source of nutrients as they gradually decompose. The extent of detrimental soil conditions is not expected to increase above the predicted levels in any of the activity areas proposed for these non-mechanical post harvest treatments (Soils Report page 19).

Constructed fire lines, both machine and hand, would not contribute to an increase in the amount of detrimentally impacted soils under either alternative. Machine constructed line, constructed with a low-ground pressure ATV type of machine pulling a small wedge-shaped plow would expose mineral soil with a width of approximately 2.5 to three (3) feet. Hand constructed line, built using hand tools such as shovels, pulaskis, and other similar tools, would be approximately 18 to 24 inches in width. Neither method would result in the removal of organic materials in large areas that exceed five (5) feet in width and would therefore not meet the definition of detrimentally impacted soils as defined by Forest Service Manual (FSM) 2520 (Soils Report page 20). Soil compaction is not a concern because equipment would make only a single pass. Upon completion of burning activities, displaced topsoil and unburned woody debris would be redistributed over machine lines which would help to protect the exposed soil from wind

erosion until revegetation was successful. Litter materials from adjacent trees and residual shrubs, coupled with the re-establishment of herbaceous vegetation (grasses, forbs), shrubs and trees would provide additional new sources of organic materials for humus development on the exposed mineral soil on both machine and hand lines (Soils Report page 20).

With the exception of units C305 and C339 in Alternative 3, all harvest units that have post-harvest prescribe fire treatments proposed would see detrimental soil conditions remain at or below the 20 percent standard under both alternatives upon completion of burning prescriptions. Units C305 and C330 have subsoiling prescribed to reduce detrimental soil impacts and bring those units into compliance with both the Regional and LRMP standards and guidelines.

Both alternatives propose the closing and decommissioning of existing system roads. Under Alternative 2, approximately three (3) miles would be closed and approximately 16 miles decommissioned. Under Alternative 3, approximately 27 miles would be closed and approximately 14 miles would be decommissioned. Roads proposed for closure would not be removed from the transportation system and would remain available for future management activities. Administrative use, including use by permittees or others under permit, would continue; public use using motorized vehicles would be prohibited. The existing levels of detrimentally disturbed soils associated with these roads would not change because the road prism area would not be subsoiled or otherwise restored to a natural state.

Roads proposed for decommissioning would have the road width subsoiled preventing all motorized vehicle traffic. On some roads, only a portion of the road, usually the initial 50 to 100 feet, may be subsoiled with the remainder of the road allowed to return to a natural state through the establishment of native vegetation and accumulation of litter and organic matter over time. Both alternatives would decommission roads by subsoiling; approximately 16 miles under Alternative 2 and approximately 10 miles under Alternative 3. The remaining four (4) miles proposed for decommissioning[48] under Alternative 3, Forest Roads 2300-080 and 2017-400, have been identified for possible conversion to other uses, specifically as part of a designated class II (OHVs greater than 50 inches in width) trail on Pine Mountain. Until a decision is made to either designate or not designate such a trail, these roads would not be subsoiled.

Both alternatives also propose approximately 37 miles of road maintenance activities including drainage work (approximately 7.4 miles) and approximately 30 miles of resurfacing with crushed aggregate. Road maintenance activities would reduce accelerated erosion rates where improvements are necessary to correct drainage problems on specific segments of existing road. Surface erosion can usually be controlled by implementing appropriate Best Management Practices (BMPs) that reduce the potential for indirect effects to soils in areas adjacent to roadways. Road maintenance activities would not be necessary on roads closed to public access because self-maintaining drainage structures would be installed, where appropriate, to protect the road surface from erosion. There are no major soil-related concerns associated with these future management activities (Soils Report pages 40-41).

***Other Effects***

***Coarse Woody Material and Surface Organic Matter*** **-** Current levels of CWM and surface organic matter are unknown for site specific locations across the planning area. However, it is expected that adequate amounts of each currently exist to protect mineral soil from erosion and to provide nutrients to maintain soil productivity over much of the project area. At least some areas, such as in the Tepee Draw

[48] There are two definitions of the word decommissioning used here. The first, and most common, use refers to subsoiling the road to prevent use by motorized vehicles. The second use is utilized in transportation management and refers to the removal of the road or road segment from the transportation system. It is this latter use that is applied to the approximately four miles of road recommended for conversion to other uses.

and Sand Springs portions of the planning area, that had management activities implemented prior to LRMP implementation in 1990, likely contain less than desired amounts of CWM. It is likely that levels of both CWM and surface organic matter have been increasing as additional material has accumulated over time through natural mortality, windfall, recruitment of fallen snags, and litter fall.

**Alternative 1** - Short-term (up to five (5) years) levels of CWM and surface organic matter would continue to be maintained or improve until a wildfire event. In forested areas, CWM would be expected to continue to increase through natural mortality, windfall, and recruitment of fallen trees and snags. In both forested and xeric shrub areas, short-term nutrient sources would also increase through the accumulation of small woody materials from shrub and tree branches, annual leaf and needle fall, and the decomposition of grass and forb materials. Existing and projected high fuel loadings would be expected to support an uncharacteristic, high intensity wildfire that is capable of consuming all of the surface organic matter and most if not all of the accumulated CWM in areas when it occurred. The timing and location of such an event cannot be determined only that it would be expected to occur.

It is also important to note that on the eastside of the Deschutes National Forest (which includes the Opine planning area), wildfires occurring during dry summer months typically consume even larger diameter (12 inches and larger) downed logs (Soils Report page 9).

Long-term, greater than five (5) years, fuel loadings in xeric shrub communities, transitional range, and forested areas would continue to increase thereby increasing the risk of an uncharacteristic, high intensity wildfire. These conditions increase the risk that, should such a fire occur, large areas of vegetation, coarse woody material, and surface organic matter would be killed or consumed and large areas of soil exposed to subsequent wind and water erosion. High intensity fires and/or long duration burning, especially in large fuels such as logs and snags, increases the potential for the development of hydrophobic soils, the volatilization of soil nutrients, the reduction and/or loss of soil productivity, the destruction of the litter layer, and increases the potential for accelerated wind erosion. These types of fire remove or reduce coarse woody material that provides long-term nutrient input and water storage capability that help to support the growth and development of both flora and fauna. In forested areas, at least some of the CWM losses of logs and snags would, over the long-term would be at least partially replaced by trees killed by fire and falling to the forest floor.

Although hazardous fuels have been reduced in some previously managed areas, fire exclusion has resulted in undesirable vegetation conditions and excessive fuel loadings in other portions of the planning area. This alternative would defer fuel reduction opportunities at this time. In forested areas, coarse woody materials have accumulated through natural mortality, windfall, and recruitment of fallen snags over time. If a large amount of fuel is present during a future wildfire, soil temperatures can remain high for an extended period of time and excessive soil heating would be expected to produce detrimental changes in soil chemical, physical, and biological properties. Severely burned soil would mainly be confined to localized microsites beneath downed logs, stumps, or around the root crowns of individual trees. Severe burning may cause soils to repel water, and the loss of protective ground cover increases the potential for accelerated surface erosion by water and wind.

Within the grass/shrub communities, fires are usually fast moving and surface temperatures are not elevated long enough to cause severely burned soils. Some short-term increases in surface erosion would be expected until vegetation recovers but the time the soil is exposed is short because green-up of herbaceous vegetation soon follows precipitation events. In those areas where tree encroachment has occurred, there would be an increasing risk of localized occurrences of severely burned soils where large fuels such as logs and stumps are present.

**Alternatives 2 and 3 -** The measure for CWM and surface organic matter was evaluated qualitatively based on the probable success of implementing appropriate BMPs and recommended guidelines that address adequate retention of these important landscape components to meet soil productivity and wildlife habitat objectives (see Wildlife Section and Chapter 2 Mitigation). A minimum amount of 5 to 10 tons per acre of CWD on ponderosa pine sites and 10 to 15 tons per acres on mixed conifer or lodgepole pine sites is recommend to ensure desirable biological benefits for maintaining soil productivity without creating an unacceptable fire hazard (Brown et al., 2003 Graham et al ., 1994). Based on guidelines for estimating tons per acres of CWD (Brown 1974, and Maxwell, Ward, 1980), the levels of CWD retention to meet wildlife habitat objectives (Eastside Screen direction) would also meet these soil resource objectives (Soils Report, page 31).

The proposed harvest activities under both alternatives would reduce potential sources of future CWM, especially where mechanized whole-tree yarding is used in activity areas. Harvest activities also recruit CWM to the forest floor through breakage of limbs and tops during felling and skidding operations. Existing down woody material, other than lodgepole pine, would be protected from disturbance and retained on site to the extent possible. Understory trees, damaged during harvest operations, would also contribute woody materials that provide ground cover protection and a source of nutrients on treated sites. It is expected that enough broken branches, unusable small-diameter trees, and other woody materials would likely be available after mechanical thinning activities to meet recommended guidelines for CWM retention. Long-term, scattered blow down, broken tops and other natural processes are expected to add to existing amounts of CWM (Fire/Fuels and Air Quality Report). Alternative 3, because it treats more acres and therefore removes more potential mortality, would result in a greater reduction in potential future CWM (long-term) than would Alternative 2. Conversely, Alternative 3 also would potentially provide more debris, damaged trees, unusable material, and related materials than would Alternative 2 (short-term).

Fuel reduction treatments would also reduce CWM and some of the forest litter by burning logging slash and natural fuel accumulations. Logging slash generated from commercial harvest that is in excess of requirements for wildlife and soils, would be machine piled and burned on log landings and/or main skid trails. Post-harvest review by fuel specialists would determine the need for prescribed underburn treatments, especially where fine fuel accumlations increase the risk of wildfire to unacceptable levels. If prescribed fire is recommended, burning would occur during moist conditions to help ensure adequate retention of CWM and surface organic matter following treatment. Fuel reductions achieved through planned ignitions usually burn with low-to-moderate intensities that increase nutrient availability in burned areas. Low intensity fire does not easily consume material much larger than 3 inches in diameter, and charring does not substantially interfere with the decomposition or function of coarse woody debris (Graham et al., 1994). Although proposed prescribe burning is not intended to intentionally kill residual trees, tree mortality in varying amounts and in various tree sizes will occur during the implementation of burning. Research on light to moderate intensity and severity underburns show that approximately a six (6) percent mortality in trees less than two (2) inches DBH (Fire/Fuels and Air Quality Report). Any dead trees killed from prescribed burn treatments will eventually fall to the ground and become additional sources of CWM. Depending on the rate of decay and local wind conditions, many of the small-diameter trees (less than 10 inches) would be expected to fall within the short-term (less than 5 years). Alternative 2, because it has more acres of fuel reduction treatments and many acres overlap vegetation (timber harvest) treatments, has the greater potential to result in a greater short-term reduction in both CWM and surface organic matter than does Alternative 3. Long-term, greater than five (5) years, there is likely to be no measurable difference in the quantity or distribution of CWM associated with fuel treatments under either alternative. Very long-term (10 years and longer), because Alternative 3 thins more acres than Alternative 2, there will likely be greater potential numbers of larger diameter CWM much sooner under Alternative 3 than Alternative 2 due to increased growth rates on residual trees.

A cool-temperature prescribed burn would remove some of the surface litter and duff materials without exposing extensive areas of bare mineral soil. Effects to the soil resource include:

- a reduction of fuel loadings and wildfire potential;
- increased nutrient availability in localized areas; and
- maintenance of organic matter that supports biotic habitat for mycorrhizal fungi and microorganism populations.

Assuming the same or similar burning prescriptions and conditions, Alternative 2, because it prescribes the use of fire on more acres than Alternative 3, has a somewhat greater positive effect on soils than does Alternative 3 in the short-term nutrient availability

Design criteria, mitigation measures, and best management practices (Soils Report pages 33-36) are expected to minimize the amount of bare soil created as a result of timber harvest and fuel reduction activities regardless of the alternative. Long-term, more than five (5) years, there is likely little or no measurable difference in the amounts of CWM that would be available under either alternative.

## Sensitive Soils

The LRMP identifies criteria for identifying soils that are sensitive to management needs (LRMP, Appendix 14, Objective 5, page 14-2). For the planning area, these include:

- soils on slopes greater than 30 percent;
- soils associated with frost pockets in cold air drainages;
- soils that occur in localized areas of rocky lava flows; and
- soils with high or severe hazard rating for surface erosion.

There are no potentially wet soils with high water tables.

Approximately 46 percent (24,976 acres) of the planning area contains landtypes with localized areas of sensitive soils. Although a relatively large part of the planning area contains landtypes with sensitive soil concerns, only portions of these total landtype acres actually have sensitive soils meeting the above listed criteria. Areas with sensitive soils are typically confined to specific segments of the dominant landform and they are generally too small to delineate on maps.

Table 3-29 displays the Soil Resource Inventory (SRI) unit designation, the landform types, the type of management concern associated with the landform type, and the number of acres within the planning area associated with the landform type or types.

**Table 3-29 Landform Types and Sensitive Soils**

| SRI Map Unit Symbol | Geomorphology (Representative landforms) | Type of Concern[49] | Landtype Acres |
|---|---|---|---|
| 11, 7C, NA, NB | Rough, uneven lava flows | 3 | 9,649 |
| 7, 15 | Depressions or Flats | 2 | 3,542 |
| 4C | Alluvial fans and toeslopes | 4 | 1,266 |
| 14, LG | Edges of lava flows with steep uneven slopes | 1, 3 | 269 |
| 49, 91 | Steep slopes of outwash plains, mountain slopes | 1, 4 | 6,060 |
| 68, 80, 81, 82, 7H, 7K | Steep slopes on volcanoes, buttes, ridges, and cinder cones. | 1 | 4,190 |

[49] Management Concerns: **1.)** On slopes greater than 30 percent, loose sandy soils are susceptible to soil displacement; **2)** Very low productivity due to frost heaving, low fertility, and temperature extremes; **3)** Sensitive soils with variable depths in pockets and cracks of rocky, uneven lava flows; and **4)** Sensitive soils with a high or severe hazard for surface erosion.

Both of the action alternatives propose mechanical harvest treatments on landtypes that contain sensitive soils in localized areas. Table 3-30 displays, by alternative, the proposed harvest units that contain small areas of sensitive soils by category and the total number of acres affected.

**Table 3-30 Proposed Mechanical Harvest Units and Acres on Landtypes with Sensitive Soils in Localized Areas.**

| Sensitive Soil Category | Alternative 2 | Alternative 3 |
|---|---|---|
| 1 - Slopes greater than 30 percent | 226 acres (total)<br>H02, H04, H07, H10, H11, H42, P03, P04, P06, P07, P08, P10, P11, SD01 & SD08 | 328 acres (total)<br>C302, C303, C305, C307, C339, P303, P304, P306, P308, P309, P310, P311, P312, P314, P315, P316, P317, P321, P322 & P324 |
| 2 - Low productivity sites limited by frost heaving, low fertility and climatic factors | 112 acres (total)<br>H29, H30, H34, P20 & P21 | 139 acres (total)<br>C329, C330, C331, C333 & P343 |
| 3 - Soils with variable depths in areas of rocky lava flows | 418 acres (total)<br>H19, H22, H32, H33, H34, H37, P19 & P21 | 715 acres (total)<br>C314, C321, C324, C329, C330, C333, C334, C335, P335, P342 & P343 |
| 4 - Soils with high hazard for surface erosion | 12 acres (total)<br>H42, P07, P08, & P10 | 80 acres (total)<br>P312, P315, P316, P317, P321, P322 & P325 |

Figures 3-14 (Alternative 2) and 3-15 (Alternative 3) display proposed harvest units relative to landform types with slopes greater than 30 percent and/or sensitive soils with high ratings for surface erosion. These management concern categories of sensitive soils occur only in the Pine Mountain portion of the planning area.

The majority of sensitive soil acres are associated with landtypes that limit regeneration potential. It is expected that many of the sensitive areas with steep slopes and high erosion hazards will be included as untreated patches within and adjacent to the proposed units to meet wildlife objectives. New logging facilities – skid trails, landings, etc. – would not be constructed in these areas. If timber harvest occurs within such areas, mechanized equipment would be required to utilize existing facilities except for mechanical harvesters which would be limited to a maximum of two passes with travel routes 30 or more feet apart. Activity areas proposed for mechanical treatments on landtypes with slopes greater than 30 percent and/or sensitive soils with high erosion hazards are identified by unit number in site-specific mitigation measures (EA, Chapter 2).

Soil displacement from ground-based harvest occurs when soil organic layers are scraped away by equipment or gouged by logs during skidding operations. This type of soil disturbance is most likely to occur on the steeper portions of harvest units (slopes over 30 percent). Only the Pine Mountain portion of the planning area contains areas where slopes exceed 30 percent and is therefore the only portion of the planning area where soil displacement is likely to be a concern.

Surface erosion is not a primary concern under Alternative 2; less than 10 percent of the unit acres contain soils susceptible to erosion damage. Under Alternative 3, of the eight units proposed for treatment that contain sensitive soils, only two, P321 and P325, have more than 10 percent of the unit acreage with soils with high erosion hazards. Use of all reasonable Best Management Practices (BMPs) for Timber Management and Road Systems would protect the soil resource and control erosion on roads and logging facilities used during project implementation (Soils Report, page 30).

There are no sensitive soils located either within or in the vicinity of the two regeneration harvest units proposed under Alternative 2. No sensitive soils are located in the area proposed for tree planting at the Pine Mountain Observatory under either alternative.

**Figure 3-14 Landform Types Associated with Sensitive Soils and Timber Harvest Units - Alternative 2.**

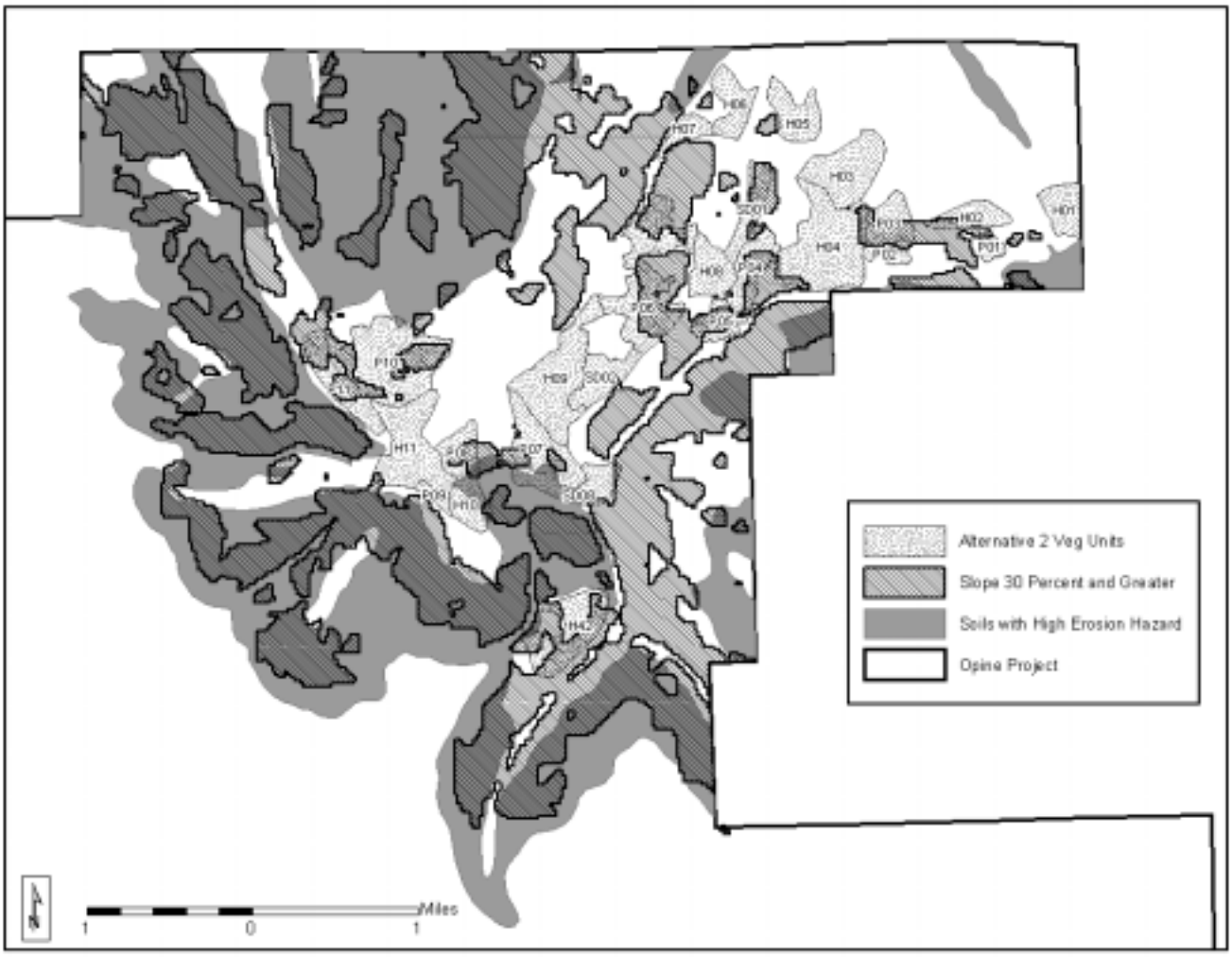
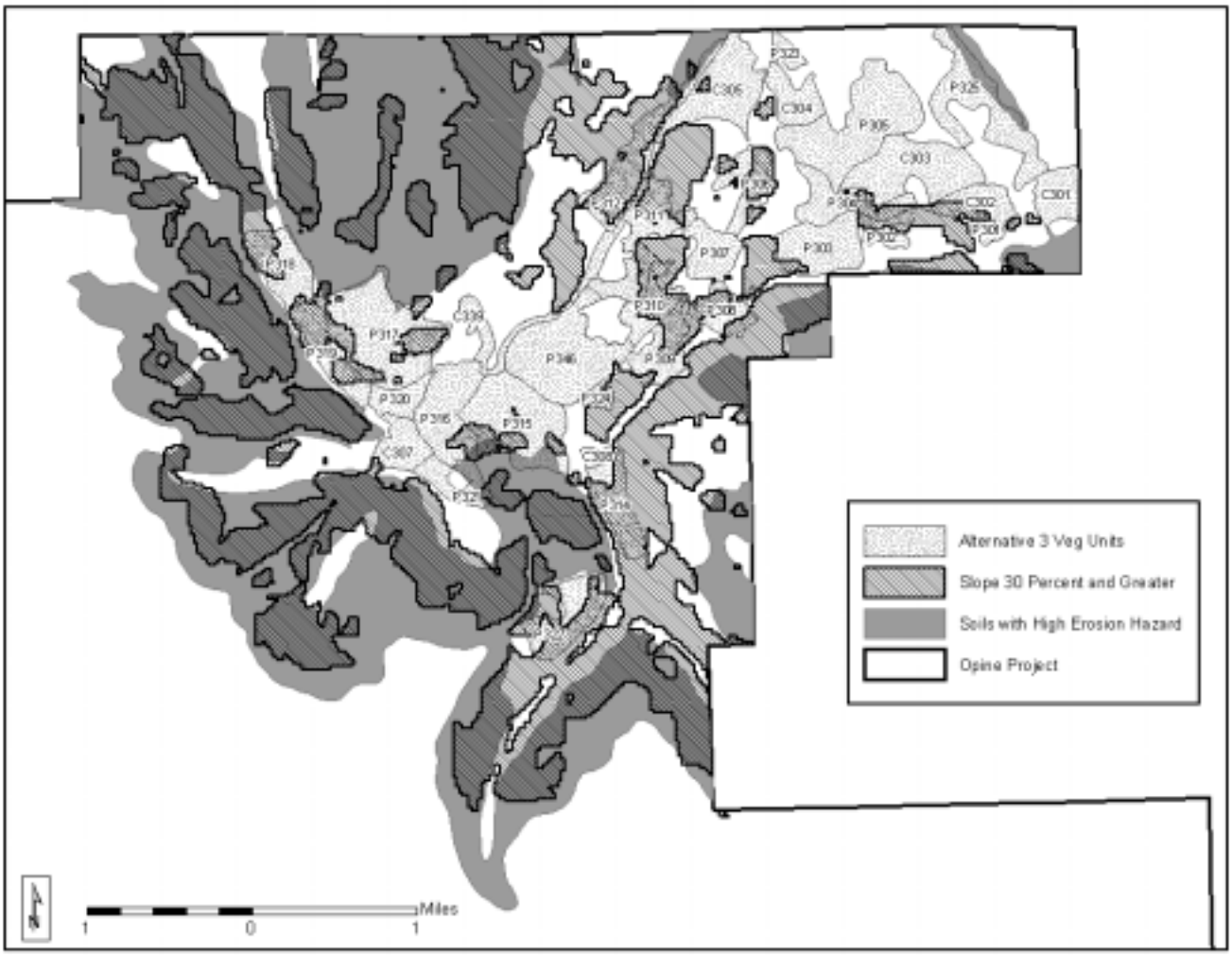


**Figure 3-15 Landform Types Associated with Sensitive Soils and Timber Harvest Units - Alternative 3**




Subsoiling is proposed in some harvest units (units H19 and P19 under Alternative 2 and C314 and C324 under Alternative 3) that overlap landtypes containing soils with variable depths on rocky lava flows. Although rock fragments on the surface and within soil profiles can limit subsoiling opportunities, hydraulic tripping mechanisms on winged subsoiling equipment helps reduce the amount of subsurface rock that could potentially be brought to the surface. Most of the surface organic matter and smaller logging slash would remain in place because the equipment is designed to allow adequate clearance between the tool bar and the surface of the ground.

***Other Effects***

There would be no direct or indirect impacts from sale area improvement projects on the soil resource. Construction of fence lines is not considered an activity that converts soil to a non-productive condition. Construction of gates would occur on or adjacent to an existing road bed and within the previously disturbed area associated with the road prism. None of the planned locations for these management facilities overlap with any of the activity areas proposed for mechanical harvest treatments under either of the action alternatives. Consequently, there would be no cumulative increase in the estimated percentages of detrimental soil conditions disclosed in Table 3-29 or the unit specific information contained in Appendix B, Tables B-1 and B-2.

**Cumulative Effects**

The discussion of the cumulative soil effects and soil quality standards in this section is focused on the units (activity areas) proposed for silvicultural and fuel reduction treatments. As noted previously, short-term effects are those expected to occur and the effects disappear within five (5) years; long-term would be greater than five (5) years.

The combined effects of past and current disturbances and those anticipated from implementing the proposed actions were previously addressed under existing conditions and the analysis of direct and indirect effects. Future management activities are assumed to occur as planned in the schedule of projects for the Deschutes National Forest. No outyear timber sales or fuel reduction projects are currently scheduled in areas that would overlap with any of the activity areas proposed within the Opine planning area (Soils Report, page 38).

There would be no additional increase in the number of acres of detrimental soil impacts associated with timber harvest activities beyond those previously discussed. Under Alternative 1, the total number of acres of detrimentally impacted soils would increase by approximately six (6) acres to 1,573 acres (approximately three (3) percent of the planning area) due to new water developments (water sets, water line extensions, and water troughs) proposed under the Cinder Hill and Cluster II Range Analyses EAs. Under Alternatives 2 and 3, the number of detrimentally impacted acres would increase by 699 and 759 acres respectively associated with new logging facilities, post-harvest subsoiling activities, and new water developments associated with grazing activities. Subsoiling would be used to decommission existing system roads under both action alternatives. Restoration acres within proposed activity areas were deducted in the disturbed area estimates in Appendix B (Tables B-1 and B-2), because subsoiled areas are expected to reach full recovery within the short-term. The cumulative result of these actions would increase the percentage of detrimentally impacted soils associated with various management facilities from the current approximately three (3) percent to approximately four (4) percent of the planning area acres.

The expansion of the permit boundaries to nine (9) acres and the construction of new facilities for the Pine Mountain Observatory would convert about 0.9 acres of additional soil to a non-productive condition. The amount of soil committed to facilities and other uses would total approximately 1.4 acres or approximately 16 percent of the permit area with detrimental soil conditions from future development. This amount is within allowable LRMP limits for maintaining soil productivity. From a larger landscape scale, the increase of 0.9 acres of detrimental soil impacts would be a negligible increase within the planning area, less than 0.001 percent of the planning area acreage.

There is a proposal to designate a Class II (vehicles greater than 50 inches wide) OHV system trail to provide additional motorized access opportunities on Pine Mountain. There would be no cumulative increase the level of detrimental soils impacts under any of the alternatives. This proposal would not require additional soil disturbance from construction activities because the designated route would utilize existing segments of local system and non-designated roads. No turnouts or other widening would occur within the existing road prisms. The extent of detrimentally disturbed soil committed to system roads and non-designated roads/trails within the planning area were previously accounted for. Existing road and trail segments that cross through portions of activity areas proposed for mechanical harvest (Alternative 2 - units H11, P10, and P11; Alternative 3- units P307, P317, and 320) were analyzed and included in the estimated percentages of existing soil impacts associated with those units in the soils analysis (Appendix B, Tables B-1 and B-2).

Four (4) cattleguards would be installed to replace existing gates on specific road segments. Gates would likely be installed in other locations along this route. Berms and tank traps on currently closed

roads would be removed to permit access. None of these activities would remove additional land from production because excavation and other activities would occur on previously impacted soils within the existing road prism or the disturbed area of the non-designated road segments.

Surface erosion on these sites would continue to exceed the natural rates of undisturbed soils whenever rainfall intensities or snowmelt are great enough to cause overland flow on the compacted tread surface. Erosion damage, such as the formation of rills and gullies, can become excessive where running water becomes channeled in tire ruts of unprotected soil. Current erosion damage and drainage problems would be corrected by installing rolling, drivable dips at appropriate spacing distances to disperse runoff water into vegetated delivery areas. Road segments with improper design (non-designated) would continue to deteriorate without an active program of maintaining these drainage structures. It is anticipated that road and trail condition surveys would be performed at regular intervals to prioritize where maintenance activities are needed to maintain adequate drainage and minimize erosion damage both on the road or trail surface and in adjacent delivery areas. A seasonal closure would likely be imposed during wet periods to protect the road surface from rutting/erosion damage and reduce maintenance needs.

The Deschutes National Forest is currently evaluating its travel management policies and direction in light of recent direction provided by the Washington Office of the Forest Service. The proposed new travel management direction would identify a system of roads and trails for motorized travel and eliminate cross country motorized travel except on designated routes. This change in policy and management direction would have no measurable short-term cumulative impact on soils if alternatives 1, 2 or 3 of this analysis are selected.

This change would have no measurable cumulative effect on the area within the boundaries of the EFR OHV trail system under either alternative. Motorized travel is currently restricted to designated roads and trails. The proposed change in direction would incorporate the existing direction for the EFR area.

For the next three to five (3 to 5) years, motorized travel, including cross country motorized travel, would continue. New unauthorized roads and trails would continue to develop; existing unauthorized roads and trails would continue to experience erosion problems. Some additional expansion both in terms of length and width of existing unauthorized routes would be expected.

Grazing has been reauthorized in the Pine Mountain and that portion of the Cinder Cone Allotment within the boundaries of the Opine planning area. Appropriate stocking levels, rotation of grazing use, and periodic rest of pastures would continue to ensure adequate ground cover that effectively minimizes erosion and adverse effects to soils within the project area. The forage vegetation and soil resource would be managed in accordance with all applicable LRMP standards and guidelines to ensure that soil productivity will not be impaired by range management practices. The construction and removal of fences would have no cumulative impact on soil resources. Fences and fencelines are not considered facilities that convert soil resources to a non-productive condition.

Establishment of three (3) new water sets in the Cinder Cone Allotment and three (3) new water troughs in the Sand Spring Allotment would result in an increase of approximately six (6) acres of detrimental soil compaction and loss of vegetation around those locations. This would result in an approximately 0.011 percent increase in the number of detrimentally impacted acres of soil in the planning area. None of these sites is located within the boundaries of vegetation treatment units proposed for mechanical treatment.

Grazing within the Sand Springs Allotment was authorized in January 2006. It permits the construction of approximately one (1) mile of new waterline to extend any existing waterline would have no measurable effect on soils. The majority of the line would be located along a system road and be located within previously disturbed areas. Two water line extensions, totaling less than one half (0.5) miles would require soil disturbance and result in less than two (2) acres of soil displacement of the surface organic layer and exposure of soil to possible wind erosion. These effects would be expected to be short-term, less than five (5) years. Compaction would be limited in depth due to the small size of the equipment and limited duration of use. Freeze-thaw, wetting-drying cycles, and rodent action would be expected to restore compacted soils to pre-construction or near pre-construction condition in the short-term. Re-establishment of vegetation would also help to reduce compaction and contribute organic materials to restore the surface organic layer. Construction would result in no measurable long-term increases in detrimental soil conditions.

Ongoing road maintenance activities (those beyond those included as part of this analysis) would reduce accelerated erosion rates where improvements are necessary to correct drainage problems on specific segments of existing road. Surface erosion can usually be controlled by implementing appropriate Best Management Practices (BMPs) that reduce the potential for indirect effects to soils in areas adjacent to roadways. Road maintenance activities would not be necessary on roads closed for access restriction because self-maintaining drainage structures would be installed where appropriate to protect the road surface from erosion. There would be no measurable cumulative impacts on the soil resource as a result of these activities.

The construction of two (2) new guzzlers to provide water for wildlife on Pine Mountain has had no measurable cumulative effect on soils. Less than 500 square feet of soil were required to construct the two guzzlers. Due to the size of the planning area (54,623 acres), the relatively small extent of additional soil disturbance associated with these activities are negligible. Neither of the proposed locations overlaps with any of the activity areas proposed for mechanical treatments. There would be no cumulative increase in the estimated percentages of detrimental soil conditions in either proposed treatment units or the planning area under either action alternative.

There are no measurable cumulative effects expected on the amount or presence of CWM associated with any reasonable and foreseeable action. None of the actions would affect the amount or quality of CWM present within the planning area. Construction or maintenance of facilities, including trails, campgrounds, buildings, etc., may result in the redistribution of existing materials during construction or maintenance but would not result in the loss or physical removal of such material from the planning area.

Neither the regional nor the Central Oregon noxious weed control EIS' are expected to have cumulative impacts on soil resources within the planning area. Both would provide direction to implement various treatments to control invasive plants in site-specific areas within the planning area. These future activities are not expected to cause any detrimental changes in soil properties. Hand removal of individual plants would result in small areas of soil disturbance or the mixing of soil and organic matter which would not meet criteria considered detrimental to soil productivity. It is also unlikely that herbicide treatments would cause any adverse direct or indirect effects to soil productivity (18 Fire Herbicide Treatment Environmental Assessment, Soils Report, 2005).

There would be no measurable cumulative effects associated with the implementation of Alternative 1. No actions would be implemented; impacts associated with past and present actions would remain as described under direct and indirect effects. There would be no change in impacts associated with reasonable and foreseeable future actions.

Under Alternatives 2 and 3, there would be no change in impacts associated with past and present actions as described previously. Reasonable and foreseeable actions would be expected to incorporate appropriate design criteria and mitigation measures that would reduce or eliminate expected environmental impacts to the soil resource. None of those actions would be expected to result in measurable changes to the soil resource beyond that previously described.

**Soils - Forest Plan Compliance**

There are no specific standards and guidelines in the LRMP for soil resources under any of the land management allocations within the planning area. Forest-wide standards and guidelines apply to this project proposal.

Compliance with LRMP standard and guideline SL-5 is addressed by excluding small portions of activity areas that contain steep slopes over 30 percent and/or sensitive soils with high hazard ratings for surface erosion. There would be no new construction of temporary roads or logging facilities in such areas. None of the proposed activity areas overlap landtypes that contain soils with potentially wet soils with seasonally high water tables that would require special mitigation (Soils Report page 41).

All reasonable Best Management Practices for Timber Management and Road Systems, project design elements, and management requirements would be applied to protect the soil surface and control erosion on and adjacent to roads and logging facilities that would be used during project implementation. These conservation practices are designed to avoid or minimize potentially adverse impacts and they are to be implemented during and following project activities to meet the stated objectives for protecting and maintaining soil productivity.

The application of subsoiling treatments to rectify soil compaction impacts and promote the maintenance or enhancement of soil quality complies with LRMP interpretations of Forest-wide standards and guidelines SL-3 and SL-4. Subsoiling mitigation is also supported by the Forest Service Manual and Regional direction for planning and implementing management activities (FSM 2520, R-6 Supplement No. 2500-98-1) (Soils Report page 42). Although a few activity areas (Alternative 2: Units H38, H41, and P04; Alternative 3: Unit C336) would still have detrimental soil conditions that exceed the 20 percent standard, there are no violations of Regional policy (FSM 2520, R-6 Supplement) or the LRMP interpretation of Standards and Guidelines SL-3 and SL-4 (Final Interpretations, Document 96-01, Soil Productivity, 1996). The project would not cause an activity area to move from a detrimental soil condition of less than 20 percent to one that is greater than 20 percent; nor would the project increase detrimental soil conditions in activity areas that currently exceed 20 percent of the unit area. Both action

alternatives balance the goal of maintaining and/or improving soil quality following project implementation and soil restoration activities (Soils Report, page 42).

The proposed actions are also expected to comply with recommended guidelines that ensure adequate retention of coarse woody debris and surface organic matter following post harvest activities (Soils Report, page 42).

Under all alternatives, the combined effects of all past, present, and reasonably foreseeable management activities would be within allowable limits set by Regional direction and LRMP standards and guidelines for protecting and maintaining soil productivity within each of the proposed activity areas (Soils Report, page 42).

## Economic and Social Analysis

### Economic and Social Analysis Introduction

The importance of recovering economic value and maintaining a ponderosa pine and lodgepole forest are one of the primary purposes of the Opine Vegetation Management Project. The economic gain from harvesting does not cover all the costs associated with the fuels treatment and non commercial thinning a ponderosa pine/lodgepole pine forest on the 54,623 acres. There is a long timeline need to implement the project, in relationship to the high fuel loading and high risk from a wildfire. There is also concern from high risk associated with insect and disease related to the high tree stand densities within the project area. There would be a positive cash flow from the commercial treatments under both action alternatives, which would help to reduce the cost of proposed fuels and non commercial treatments proposed under both action alternatives. Overall, there would be a negative economic value, when considering all of the fuels and non commercial treatments proposed with either of the action alternatives.

Economic impact analysis of the activities proposed in the Opine Vegetation Management Project focuses on the makeup of the communities of Central Oregon, a comparison of recent local work and unemployment data to the state of Oregon as a whole, and a discussion of economic trends by industry.

Social factors important to Central Oregon, and specifically to land and forest management as a source of local income include: the region's rural setting and its history of a large wood products industry, farming, and ranching; the manner in which the local population utilizes resources for recreation; the collection of wood for fuel, fish and game for sport; and the effect of an increasing population on the region's job market and economy.

Economic and Social Analysis Existing Condition

**Demographics**

Five Central and South Central Oregon counties; Jefferson, Crook, Klamath, Lake and Deschutes Counties, are considered in this analysis. The Opine Vegetation Management Project area is located within Deschutes County. The total population for the five county area during the 2000 Census totaled 224,735. Populations and change for the region and by each individual county are displayed in the following Table 3-31.

**Table 3-31 Central Oregon Population Growth**

| | *Population* | | *Change* | |
|---|---|---|---|---|
| | *1990* | *2000* | *Actual* | *Percent* |
| **Central and South Central Oregon** | 167,623 | 224,735 | 57,112 | 34.1 |
| **Jefferson County** | 13,676 | 19,009 | 5,333 | 38.9 |
| **Klamath County** | 57,702 | 63,755 | 6,053 | 10.5 |
| **Deschutes County** | 74,958 | 115,367 | 40,409 | 53.9 |
| **Crook County** | 14,111 | 19,182 | 5,071 | 35.9 |
| **Lake Co.** | 7,176 | 7,422 | 245 | 3.4 |

The major population centers within the area are: Klamath Falls (19,462), Prineville (7,356), Bend (52,029), Redmond (13,481), Madras (5,078), and La Pine (5,799).

Future population projections mimic that of the past decade. Deschutes, Crook, and Jefferson Counties are expected to continue with aggressive growth.

As with the nation and Oregon as a whole, the population in the Central Oregon area is becoming both older and more diverse; but there are major differences within the area. For instance, the major cities, Bend, Redmond, Prineville, Madras, had lower medium ages than Oregon, in fact Prineville's, Madras's, and Redmond's medium age has actually decreased since 1990. Whereas more rural counties like northern Klamath County and unincorporated areas such as La Pine, are much older than the National or Oregon average and tend to be more retiree-heavy. Although racial diversity is increasing, with the Hispanic population increasing the fastest, Central Oregon, except for Jefferson County, is less racially diverse than Oregon as a whole. According to the 2000 census, Lake is 91 percent white with the Hispanic population increasing 50 percent, Crook is 93 percent white with the Hispanic population increasing 179 percent since the 1990 census, Deschutes is 95 percent white with the Hispanic population increasing 182 percent, Jefferson is 69 percent white with the Hispanic population increasing 133 percent. Klamath is 87 percent white with the Hispanic population increasing 66 percent. Oregon as a whole is 87 percent white with a Hispanic population increase of 144 percent.

The education attainment level, except for Deschutes County, within Central Oregon, is also lower than Oregon's as a whole. The percentage of population having graduated from high school is 47 percent in Crook, 56 percent in Deschutes, 44 percent in Jefferson and 49 percent in Klamath and Lake Counties. For Oregon as a whole it is 53 percent.

**Employment**

According to the 2000 Census, estimated civilian labor force is: Crook, 7,525, up 12 percent since the 1990 census; Deschutes, 57,614, up 40 percent since the 1990 census, Jefferson, 8,570, up 31 percent since the 1990 census, Klamath, 28,753, up 6 percent since the 1990 census and Lake down 4 percent since the 1990 census. Where as the labor force in Oregon as a whole increased 18 percent. In Crook County the three largest sectors were trade (1,640), lumber and wood products (1,510), and government (1,180). In Deschutes County the three largest sectors were finance, insurance, real estate (14,170), trade (13,080), and government (6,900). In Jefferson County the three largest sectors were government (2,460), trade (1250), and lumber and wood products (1,150). In Lake County the three largest sectors were government (940), trade (500), and lumber and wood products (290). In Klamath County the three largest sectors were finance, insurance, real estate government (5,580), trade (5,510), and government (5,400).

Unemployment rates in the individual counties were: Klamath 7.9 percent, Crook, 8.4 percent; Deschutes, 6.4 percent; Jefferson, 5.6 percent and Lake, 6.4 percent. The unemployment rate in Oregon as a whole was 5.7 percent.

The economies of Deschutes and Jefferson are the most robust in the Zone. In Deschutes County, although there has been an increase in the number of jobs created, the huge increase in the labor force (up 40 percent) has negated much of this success, at least in terms of the unemployment rate. But, due to their diversity, both economies are expected to remain very strong. On the other hand, in Crook, Lake and Klamath Counties, with their low overall low economic diversity, dominated by either one manufacturing sector industry (lumber and wood products) or limited trade sectors (Les Schwab in Crook County), have had their economies lag behind Oregon's as a whole. Future projections call for continued growth and diversification of their economies in these three counties.

**Income**

Average annual wages in Central Oregon are displayed in Table 3-32 below.

**Table 3-32 Average Annual Wages in Central Oregon 1990 – 1999 ***

| Industry | 1990 | 1999 | Change | Percent Change |
|---|---|---|---|---|
| All Industries | $25,152 | $25,516 | $ 363 | 1.4 |
| Private Coverage | 24,089 | 24,617 | 527 | 2.2 |
| Agriculture, Forest, and Fish | 19,630 | 17,983 | (1,647) | -8.4 |
| Construction and Mining | 29,156 | 28,532 | (625) | -2.1 |
| Manufacturing | 30,633 | 30,807 | 174 | 0.6 |
| Lumber and Wood Products | 31,251 | 31,811 | 560 | 1.8 |
| Other Manufacturing | 29,028 | 29,547 | 520 | 1.8 |
| Trans., Comm., and Utilities | 33,963 | 35,231 | 1,267 | 3.7 |
| Wholesale and Retail Trade | 18,510 | 19,415 | 905 | 4.9 |
| Fin., Ins., and Real Estate | 26,286 | 28,468 | 2,181 | 8.3 |
| Services | 21,493 | 23,264 | 1,771 | 8.2 |
| Government | 30,760 | 30,485 | (274) | -0.9 |

Note: * Adjusted to 1999 $
Sources: Oregon Covered Employment & Payrolls by County and Industry
Oregon Employment Department; US Bureau of labor Statistics

Per capita personal income in 1999, as reported by the U.S. Department of Commerce, Bureau of Economic Analysis by county were as follows: Lake $20,285; Klamath $20,886; Crook, $21,168; Deschutes, $26,077; and Jefferson, $18,808. Although the per capita income in the area is traditionally

lower than Oregon's as a whole, there has been a widening of the gap mainly due to the loss of relatively high paying jobs in the lumber and wood products industries. Deschutes County's per capita income, which is the highest in the area and close to Oregon's as a whole, is attributable to a number of factors. The first being that although Deschutes County also lost significant jobs in the wood products industry they have been replaced by other high-paying manufacturing jobs. In addition, the increase of high-paying "high" tech jobs, and an influx of wealthy new comers have bolstered all income measures (per capita, total personal income, and medium family income) as compared to the other counties.

Although the past decade has seen a significant reduction in employment within the lumber and wood products industry, the lumber and wood products industry is still an important contributor to the local economies. In Crook County, 1,510 people were employed in the lumber and wood products industry. This accounts for 25 percent of all wage and salary employment in the county, and represents the third highest paying job in the county. In Deschutes County, 4,770 people were employed in the lumber and wood products industry. This accounts for 10 percent of all wage and salary employment, and represents the seventh highest paying job in the county. In Jefferson County, 1,150 people were employed in the lumber and wood products industry. This accounts for 19 percent of all wage and salary employment, and represents the third highest paying job in the county. In Klamath County, 3,180 people were employed in the lumber and wood products industry accounting for 19 percent of all wage and salary employment. In Lake County, 13 percent of all wage and salary employment was in the lumber and wood products industry.

Agricultural is an important use in Central Oregon. Leading crops include cattle, forage and hays. In Jefferson County there is also a substantial amount of seed and vegetable products. Total agricultural sales for each county in 2000 were as follows: Crook, $34,604,000; Deschutes, $21,855,000; Jefferson, $46,431,000; Lake $54,508,000; and Klamath $128,806,000. Although farm income is a very small portion of total personal income in the area, the agriculture sector's role in the local economies is substantial in all but Deschutes County.

Employment and income statistical references do not specifically track recreation and tourism as a sector. Instead recreation and tourism contributes to several sectors, transportation, services (accommodations, eating and drinking, recreation), retail trade, and even government. The Oregon Tourism Commission publishes an annual report with estimates to total travel related spending in each County. Estimates for 1999 were 20.4 million in total travel spending in Crook, 414 million in Deschutes, 99.7 million in Klamath, 10.4 million in Lake, and 52.9 million in Jefferson. Estimated employments from these expenditures are as follows. In Crook, 380 people were employed in industries supporting recreation and tourism, representing 6.3 percent of all wage and salary employment in the county.

In Deschutes County, 5,160 people were employed in industries supporting recreation and tourism. This represents 10.5 percent of all wage and salary employment in the county. In Jefferson, 1,040 people were employed in industries supporting recreation and tourism. This represents 16.8 percent of all wage and salary employment in the county. In Lake, 170 people were employed in industries supporting recreation and tourism. This represents 7.7 percent of all wage and salary employment in the county. In Klamath 1,930 people were employed in industries supporting recreation and tourism. This represents 8.3 percent of all wage and salary employment in the county.

**Social**

Surrounding physical and biological environments influences human social life. This is most evident in rural areas where the variety and quality of available natural resources often determines the chief means of economic livelihood and what leisure activities people are likely to pursue and, therefore, influence local preferences for the use of public lands. From a historical prospectus it is evident that all of the local community's cultures were natural resource based and to a certain degree, especially in the more rural less populated areas, still are. Livestock, agriculture and timber were the backbone of the economic structure and as a result strongly shaped the social fabric that still defines the communities today. Since most of the surrounding land is administered by federal agencies, chiefly the Ochoco, Deschutes, Winema, Fremont National Forests and the Prineville and Lakeview Districts of the BLM, changes in federal land use policies can impact the socioeconomic and socio-cultural way of life.

One needs to keep in mind that the various communities, and the individuals within them, contain a broad spectrum of perceptions and values related to the road system and use of resources on the surrounding national forests. Recreation (often roaded and/or motorized) is also an important component of the life styles for many of the people living in these communities. These same communities and individuals also have interests that span multiple geographic and political scales simultaneously.

The following descriptions portray communities only in the most simplistic terms, and do not capture the full community richness.

Many of the communities (rural industrial, as defined in the Deschutes NF LRMP) within Central and South Central Oregon, such as Crescent and Gilchrist, are closely tied to the Forests in work, subsistence, and play, and are directly affected by what happens on the Forests. The relationship between the Forests and these communities is based in part on access to logs so that individuals can make a living from their harvesting, manufacturing, and transportation businesses; and catering to tourists drawn to the area. People from these communities also use fuelwood, fish, and game for part of their subsistence and also recreational activities.

The Sunriver destination resort community is defined by recreation opportunities and amenities and recreation residences (rural recreation and residential, as defined in the Deschutes NF LRMP). Environmental and scenic amenities and nearby recreational opportunities plays the major role in its existence. Local service-oriented businesses are the major economic driver instead of extraction-based activities.

Bend (Central Oregon Urban Center, as defined in the Deschutes NF LRMP), is the dominant community in the Zone. It has a large industrial sector with wood products playing a major role, and a large service sector based on recreation and tourism. In addition its' financial, real estate sectors, and economy as whole has increased substantially as people have moved into the area because of the amenities the surrounding area provides, much of which is associated with the national forests. It is also the major shopping and service center for most of the communities within the area. Due to its population size and density, and economic and social diversity, the health of the wood products and service sectors of the economy, along with environmental and amenity values, play an important role in defining what is important to the Bend community.

Communities such as Prineville, Redmond, and Madras, from a historically perspective, better fit the "rural industrial" community described above. But with their exploding populations and diversifying economies, they are developing a more diverse set of interests more along the lines of Bend's. With the recent weakening of the economy, it is clear that these communities are still very much tied to the woods

product industries both economically and culturally. Other communities within the Zone (such as Paulina, Silver Lake) can generally be defined as ranching or farming communities. These communities are closely tied to the Forests in work, subsistence, and play, and are directly affected by what happens on the Forests. These communities are linked more economically because of the need for summer forage for livestock, not timber, and to provide services for recreation and tourists. These communities generally have no manufacturing based industries and have small, undiversified economies. Like "rural industrial communities", the people who reside in these communities use fuelwood, fish, and game for part of their subsistence and also recreational activities.

The one over-riding demographic trend in the area is that of rapid population increase through in-migration. With the general gentrification that is occurring through the area and the influx of retirees, many of who are well to do, and professionals from many specialty areas, is resulting in rapid economic and social change.

**Economic and Social Analysis Environmental Consequences**

**Economic Efficiency**

Forest Service Handbooks 1909.17 and 2409.18 direct the evaluation of Economic Efficiency for proposed projects. To assess the economic efficiency of Alternative 2, the costs and anticipated timber volumes were entered into TEA.ECON http://www.fs.fed.us/rp/nr/fp/FPWebPage/ForestProducts/ForestProducts.htm). The timber harvest sale was evaluated for the sale as a whole with a 4 percent discount rate. TEA.ECON uses the Transaction Evidence Appraisal (TEA) system to generate basic gross timber values and estimated advertised rates. Values for timber are generated using advertised rates in the appropriate geographic area and appraisal zone. Rates were updated for the analysis and used the following cost file: version 04411, 12/31/2004.

The analysis can be used to compare alternatives, not to give an absolute number for the outputs. Numbers useful for comparing alternatives include a benefit/cost ratio, discounted benefits, discounted costs and present net value. Effects on the local economy include estimated number of jobs created or maintained.

**Volume**

Estimating value and volume is dependent primarily on species and the diameter of trees. Timber volume estimates are:

- Alternative 2 (Proposed action) - Total volume of 11,568 CCF (5.9 million board feet (MMBF); 5,639 CCF of ponderosa pine sawtimber; 1,880 CCF of lodgepole pine; and 4,049 CCF of fiber.
- Alternative 3 - Total volume of 11,001 CCF (5.65 MMBF): 5,363 of ponderosa pine sawtimber; 1,788 CCF of lodgepole pine; and 3,850 CCF of fiber.

**Costs**

The commercial harvest operation costs were developed for Alternative 2 and Alternative 3. The net sale value would depend on the market value of the timber when sold and the actual logging costs. These figures are based on the analysis discussed above. Logging costs (Table 3-33) include stump to truck (what it costs to get the trees from the harvest unit to the landing), haul (getting the trees from the landing to the mill), road maintenance, temporary road development and slash disposal. Cost assumptions are as follows:

- 2/3 of the zone average was used for both stump to truck and log haul due to short skidding distances, high production mechanized systems and mill vicinity

- zone averages were used for brush disposal, road maintenance, and temporary road development

**Table 3-33. Expected Logging Costs of Alternatives 2 and 3**

| Alternative | Acres | Total Volume (ccf) | Stump-Truck (ccf) | Brush Disp. (ccf) | Road Maint. (ccf) | Temp. Road (ccf) | Haul (ccf) | Total Cost/ccf |
|---|---|---|---|---|---|---|---|---|
| 2 | 4,313 | 11,568 | $84.53 | $8.38 | $5.43 | $0.37 | $21.47 | $120.18 |
| 3 | 3,855 | 11,001 | $84.53 | $8.38 | $5.43 | $0.37 | $21.47 | $120.18 |

**Table 3-34Alternative Financial Efficiency**

| Alternative | Estimated Volume CCF | Present Net Benefits (PNB) | Present Net Costs (PNC) | Present Net Value (PNV)) | Benefit/cost Ratio (B/C) |
|---|---|---|---|---|---|
| Alternative 1 | 0 | 0 | 0 | 0 | 0 |
| Alternative 2 | 11,568 | $130,912 | $831,890 | -$700,978 | 0.13 |
| Alternative 3 | 11,001 | $124,595 | $725,379 | -$600,784 | 0.13 |

The negative PNV for alternatives 2 and 3 reflect planning and survey costs associated with the preparation of a roads analysis and EA.

The following table identifies the related projects and costs used for Alternatives 2 and 3.

**Table 3-35 Related Projects and Costs**

| Activity | Alternative2 | Alternative 3 | Unit of measurement |
|---|---|---|---|
| **Noxious weed Monitoring** | $2,500 | $2,500 | Project |
| **Subsoil** | $8,700 | $7,200 | acre |
| **Close Roads** | $5,000 | $21,000 | miles |
| **Snags** | $21,550 | $19,250 | Project |
| **Planting** | $5,000 | $5,000 | Project |
| **Gate** | $500 | $500 | (1) |
| **Fencing** | $16,000 | $16,000 | miles |
| **Precommercial Thinning** | $489,400 | $547,300 | acre |
| **Post Old Growth Boundary** | $1,000 | $1,000 | Project |
| **Machine Pile** | $190,750 | $12,625 | acre |
| **Hand Pile** | 0 | $42,625 | acre |
| **Guzzler Installation** | $10,000 | $10,000 | (1) |
| **Water Set Fence** | $1,000 | $1,000 | (1) |
| **Fence Removal** | $2,000 | $2,000 | miles |
| | | | |
| **Total Cost** | $753,400 | $688,000 | |

**Direct and Indirect Effects of Alternative 1 - No Action**

Selection of this alternative would result in no active management of the resources. There would be no net sale value, and no additional jobs would be created or maintained. There would be no benefits to the

local economy. This alternative may have negative impacts to the local economy because timber-related jobs would not be maintained.

Although Alternative 1 would generate no current revenues to return to the Treasury of the United States of America there is a cost resulting from the expenditure of planning monies. Since there are no revenues predicted it is not possible to calculate a benefit/cost ratio.

**Direct and Indirect Effects of Alternative 2 and 3**
The harvest units under Alternative 2 and 3 have measurable economic potential in terms of the volume of raw materials that could be harvested. When the harvest related revenues and costs alone (including planning) are analyzed the PNV is a negative $700,978 (Alternative 2) and negative $600,784 (Alternative 3) with a benefit/cost ratio of $0.13 for both alternatives.

An estimated 58 timber and timber-related jobs would be created or maintained. Indirect benefits from employment would contribute to the local economy. The number of jobs maintained or created was calculated by using figures for the Deschutes National Forest from Appendix B-5 of the FY 1997 Timber Sale Program Annual Report. Excluding firewood from the volume harvested on the Deschutes National Forest in Fiscal Year 1997, an estimated 9.6 jobs per million board feet were maintained or created.

**Cumulative Effects**
The cumulative effects of all alternatives with regard to economic efficiency in the foreseeable future are based on costs and revenues. The cumulative effects on forest resources are discussed in other reports of this EA. All resources have a value, though many are difficult to identify in dollar terms.

In all alternatives the possibility of wildfire is high because of the location, weather and vegetation. What varies between alternatives in regards to fire is the fuels and future stand structure following implementation of the EA. The level of fuels remaining will contribute directly to the investment needed when fires return to the project area. The fuels accumulating in the next three decades may need treatments to protect the developing young ponderosa pine forest. These treatments may include prescribed fire or mechanical mowing of the shrub layer.

In Alternative 1 no treatment would occur. Future fires within the perimeter of the Opine Vegetation Management area would have the potential to be more difficult to control due to the high fuel loading. This potential could require more resources to control fire, create increased dangers to wild land fire fighters and increase costs to contain a fire. Future expenses to thin stands under Alternative 1 would be needed.

Alternative 2 and 3 includes commercial and non-commercial tree harvest and fuels reduction that reduces future fuel loads. Resources required to control or manage fires could be substantially less than Alternatives 1. These alternatives have the best opportunity to accelerate the establishment and development of a large diameter ponderosa pine stand and provides the best assurance that the stand can develop past the age when small diameter trees are susceptible to ground fire mortality. Alternatives 2 and 3 provides the most current and future opportunities for employment in the woods industry.

Over the last 10 years, an annual average of approximately 68.2 MMBF of timber has been sold from the Deschutes National Forest. In the near future, the amount of timber offered for sale is expected to be near this annual average. The Deschutes National Forest is expected to continue offering timber for sale and is expected to continue making contributions to the local economy as a result of timber harvest activities. If Alternative 1 was chosen, the project area would not contribute any additional benefits to the local economy as a result of timber harvest. In this scenario, the projected amount of volume from Alternative

2 and 3 may or may not be provided to the local economy as it depends on the feasibility of substituting and implementing other ongoing planned projects.

## Civil Rights and Environmental Justice

Civil Rights legislation and Executive Order 12898 (Environmental Justice) direct an analysis of the proposed alternatives as they relate to specific subsets of the American population. The subsets of the general population include ethnic minorities, people with disabilities, and low-income groups.

Environmental Justice is defined as the pursuit of equal justice and protection under the law for all environmental statutes and regulations, without discrimination based on race, ethnicity, or socioeconomic status. The minority and low income populations groups living in counties surrounding the fire area work in diverse occupations. Some minorities, low income residents, and Native Americans may rely on forest products or related forest activities for their livelihood. This is especially true for those individuals that most likely reside in the rural Central Oregon communities.

**Direct and Indirect Effects**
**Alternative 1 – No Action**
This alternative would continue the local economic situation as described above.

**Common to all Action Alternatives**
Within the social context presented above, the action alternatives developed for this project have the potential to bring in workers from the outside to perform logging, pre-commercial thinning, mushroom harvesting, and related activities. The primary services needed by the workers would be food and shelter. Local businesses that can supply food (grocery stores and restaurants) and other services would capture most of the money being spent by the workers in the area. Some businesses may need to increase their employment, either by temporarily adding employees, or giving present employees more hours. This would likely result in increased local household incomes during implementation of project activities. Since these businesses have supported similar workforces in the past, capitol expansion would probably not be required.

Since pre-commercial activities are expected to span a period of several years and it is reasonable to expect a good proportion of the work will go to minority-based small businesses, as they have in the past. The vast majority of these businesses and their employees are based along the I-5 corridor, so again most of the disposable income from these activities would not flow into local communities.

Resources gathered for subsistence or of cultural importance are not likely affected by any federal action proposed within the fire area. Reducing the amount of dispersed, non-fee camping available in the project area may have a larger impact on lower income families; however, there are numerous other available locations in and near the Opine Vegetation Planning area for free camping.

Recent research by the Center for Watershed and Community Health outline both the direct and indirect effects of wildfire on the health and welfare of impoverished individuals, families, and communities. Beside the direct impacts of the fire on potential jobs and income, there are also negative impacts to the value of property and other assets created by the public perception of risk created by local wildfires. The long-term effect of a decrease in a sustainable local timber supply for local mills combined with a short-term decrease in recreational opportunities can also affect major local employers and taxpayers. This means that the tax base decreases and the costs of sustaining local services cost more. Thus poor householders in local communities are especially vulnerable to the fallout of a wildfire on their local economy. They have limited financial ability to cope with the disruptive effects this may have on local

economic activity and dependent social services. The effects discussed in this section, are very difficult to measure, but would tend to have a disproportional impact on local low income households. In contrast, minority groups from outside the immediate area would, whether harvesting forest products or helping in pre-commercial thinning efforts, probably see fewer changes in income when compared to other groups.

## Wildlife

The following items are analyzed and effects compared by alternative:

- **Connectivity and Fragmentation;**
- **Summary of Wildlife Species / Management Indicator Species;**
- **Snags, Green Tree Replacements (GTRs) and Coarse Woody Material (CWM) Habitat;**
- **Special/Unique Habitats;**
- **Ecological Indicator Species/Habitats and Focal Species (Landbirds);**
- **Proposed Endangered, Threatened, and Sensitive (PETS) Wildlife Species; and**
- **Resident and Migratory Landbirds**.

**Connectivity and Fragmentation – Condition of Late and Old Structure Habitat (LOS)/Old Growth Management Areas (OGMAs).**

**Existing Condition**

The forested portion of the planning area has a significant amount of multi-story Late and Old Structure (LOS) ponderosa pine forest (approximately 5,220 acres or approximately 20 percent of the forest acres) and a very low amount of single-story LOS forest (approximately 644 acres or approximately two (2) percent of the forested acres). Lodgepole forest types include 3,384 acres (13 percent of the forested acres) in the late seral condition.

Table 3-38 displays seven structural stages, defines and describes each stage, and displays the alternative label commonly associated with each stage (reference Screens EA, Appendix B revised amendment #2 for definitions similar to these).

**Table 3-38 Forest Stand Structural Stages**

| Structural Stage | Definition | Description | Alternate Label |
|---|---|---|---|
| SS 1 Stand Initiation | Growing space is reoccupied following a stand replacing disturbance (e.g. wildfire, harvest). Usually early seral tree species. | Grass, forb, seed/sapling dominated. Scattered overstory may be present as in a seed tree or open shelterwood stand. | Early |
| SS 2 Stem Exclusion, Open Canopy | Crowns are open growing, canopy is broken, may be a moisture limiting area or maintained by frequent underburning, density management or high water table. | Poles to small saw logs <21" DBH. Crown closure of 25% or less. Scattered overstory may be present as in Stage 1. | Early/Mid |
| SS 3 Stem Exclusion, Closed Canopy | Occurrence of new tree stems is mostly limited by light due to tree density. Canopy is closed. | Same as Stage 2 except that crown closure is 26% or greater. | Mid |
| SS 4 Understory Initiation | Understory establishing under an overstory. Mortality in overstory creates growing space for new trees in the understory. | Broken overstory canopy, 2+ layers. Overstory is poles, small or medium size trees. Understory is seedlings/saplings or poles. | Mid |
| SS 5 Multi-Stratum without Large Trees | Several canopy layers established due to influence of management, fires, insect & disease group mortality. Large trees (>21" DBH) generally absent as a result of harvest or other disturbance. | Broken overstory canopy, 2+ layers. Large trees absent in overstory. Stands characterized by diverse distributions of trees and tree sizes. Seedlings, saplings, poles, small and medium trees present. | Mid<br><br>LOS for lodgepole pine only |
| SS 6 Multi-Stratum with Large Trees | Multi canopy layers/strata stands with large, old trees. | Broken overstory canopy, 2+ layers. Large trees dominant in the overstory. Stands characterized by diverse distributions of trees and tree sizes. All trees sizes may be present. | Late/Old |
| SS 7 Single- Stratum with Large Trees | Single canopy layer/strata of large, old trees. | Broken or continuous canopy of large, old trees. One canopy layer with co-dominants. Large trees | Late/Old |

| | | | |
|---|---|---|---|
| | | dominant in overstory. Understory absent or made-up of seedlings, saplings, grass, forbs or shrubs. | |

Approximately 20 percent of the forested acres in the planning area (5,220 acres) are identified as ponderosa pine LOS stage 6 with an additional approximately 2 percent or approximately 644 acres in LOS stage 7. This meets the criteria for Scenario A under the Eastside Screens because there is less LOS stage 7 (single-story) within the planning area boundary than there would have been historically. Approximately 13 percent of the forested acres in the planning area (approximately 3,384 acres) are identified as lodgepole pine LOS (stages 5 and 6). Table 3-39 summarizes existing LOS conditions within the planning area.

**Table 3-39 Acreages of Ponderosa and Lodgepole Pine LOS in the Opine Planning Area**

| LOS Allocation or Sub-Area | Current Acreages by Stage | | | |
|---|---|---|---|---|
| | SS5 (LPP) | SS6 / 7 (LPP) | SS6 (PP) | SS7 (PP) |
| Pine Mt. OGMA | 0 | 0 | 542 | 75 |
| Pine Mt. Sub-Area | 0 | 0 | 1,625 | 99 |
| Pumice Sprs. OGMA | 109 | 81 | <1 | 0 |
| TePee Draw Sub-Area | 0 | 0 | 1,119 | 171 |
| Potholes Sub-Area | 204 | 665 | 756 | 238 |
| Mahogany Sub-Area | 1,307 | 2,266 | 311 | 0 |
| Lavacicle Sub-Area | 289 | 359 | 657 | 12 |
| General Forest Sub-Area | 13 | 13 | 72 | 49 |
| Totals | 1,922 | 3,384 | 2,915 | 644 |

The current distribution of LOS within the planning area is poor. Localized aggregations of LOS stands occur in the areas of Pine Mountain, Pumice Springs and south of Tepee Draw. The Pine Mountain stands are the most productive and diverse; however, the lack of periodic understory fires has allowed stand densification to occur. This condition is presently limiting understory production (i.e. forbs and shrubs) and plant diversity. The dense tree stocking is creating potential conditions for epidemic insect populations and increasing the risk of a catastrophic wildfire.

The planning area contains two (2) OGMAs (MA-15) designated by the LRMP. The Pine Mountain OGMA is located on the north aspect of Pine Mountain and is approximately 1,176 acres in area. It is dominated by ponderosa pine including both wet and dry associations. It also contains small inclusions of xeric shrublands. The Pumice Springs OGMA is located near the BPA compensation station and is approximately 345 acres in area. It is dominated by lodgepole pine with significant inclusions of ponderosa pine. All of the plant associations are of the dry forest type. Both OGMAs are designated for northern goshawk management objectives by the LRMP. Old growth management plans have been developed for both areas because management activities are proposed in each by this project. Plans are required by the LRMP.

There are 26 designated wildlife travel corridors in the planning area. Each is 600 feet in width. Connectivity of habitats is believed to allow free movement, interaction of adults, and dispersal of young.

Eastside Screens require a minimum of two and preferably three connections for each OGMA. OGMAs outside of the planning area boundary were also considered for connection. Corridors previously designated and retained by adjacent projects were used in the identification and mapping of those for this project. The East Screens also require connectivity between all classified LOS (both ponderosa and lodgepole pine stages 6 and 7) forest outside of the designated OGMAs.

Connectivity for all categories is less than adequate in the planning area. The reasons for this include:

- road density and road intersections with corridors is high;
- LOS is limited and localized; and
- corridors are fragmented by non-forest habitats such as xeric shrublands.

Corridors with the objective of linking OGMA and LOS habitats should have a relatively high canopy level, or upper 1/ 3rd of site potential. Very few stands within the planning area meet either of these criteria.

The dry forest types found in the planning area do not provide habitat for those species that are highly sensitive to fragmentation, such as the northern spotted owl and Pacific fisher. Small core areas and extensive edges would give a competitive advantage to species favoring small grain mosaics over those requiring larger patches. Fragmentation by past timber harvest has occurred throughout the planning area, but is not considered significant because there have been no regeneration harvests in the ponderosa pine types. Regeneration harvest in lodgepole pine types has occurred, but mimics the natural cycle of this species, which has periodic stand replacement fires. Fragmentation by road and power line construction has had a greater impact on habitat connectivity within the planning area than past timber harvest (WL report pg 13).

**Connectivity and Fragmentation - Late and Old Structure Habitat (LOS)/Old Growth Management Areas (OGMAs)**

**All Alternatives:** All alternatives would meet standards, guidelines, and direction described in the Eastside Screens. Under Alternative 1, no treatments would be implemented in designated corridors. Currently levels on connectivity would be maintained. Connectivity for travel, LOS, and OGMAs would remain less than adequate because hiding cover is generally deficit across the planning area; road density and road intersections with corridors are high; LOS is localized and limited; and corridors are fragmented by non-forest habitats such as xeric shrublands.

**Action Alternatives**

**Alternatives 2 and 3:** Under Alternatives 2 and 3, corridors would only be thinned in order to meet their respective management objective(s), including maintenance or enhancement. Twenty (20) of the 26 corridors have one or more vegetation or fuel reduction treatments prescribed. For connections of LOS and OGMAs, the Eastside Screens specify that connectivity corridors between these habitats need to be made by: Stands in which medium diameter or larger trees are common, and canopy closures are within the top one-third of site potential. Stand widths should be at least 400 ft. wide at the narrowest point. Deer travel corridors are to be provided where needed by linking stands meeting the clump/unit conditions specified in the LRMP. Thinning of most of the travel corridors is prescribed in order to prevent future losses to insect/disease vectors or loss to catastrophic fire. Where thinning is employed within corridors adequate cover patches would be needed to reduce sight-distance. The combination of avoiding corridors, or where corridors intersect/traverse treatment units, appropriate PDCs (BG2) would eliminate the effects of the treatments on corridor goals and objectives.

Table 3-40 summarizes the overlapping of treatments on designated corridors by Alternatives 2 and 3 respectively.

**Table 3-40 Effects of Vegetation Treatments on OGMA, LOS, and Deer Connectivity Corridors**

| Corridor ID # | Total Area (net - gross ac.) | Prescriptions (acres) | | Vegetation / Fuels Treatments Acreages/Pct of Corridor) | | LOS / OGMA Connectivity Effect – Both Alts | Deer Cover Effects and Acres Present in Units | |
|---|---|---|---|---|---|---|---|---|
| | | Alt 2 | Alt 3 | Alt 2 | Alt 3 | | Alt 2[50] | Alt 3[50] |
| 1 Travel | 235 - 256 | Burn/Mow (4), Veg/Pretreat (31) | Burn/Mow (5), Veg/Pretreat (22) | 35 - 15 | 27 - 11 | No Effect - all thinning in corridor would meet screens | No cover currently present. | No cover currently present. |
| 2 Travel | 252 - 274 | Veg/ retreat (93) | Veg/Pretreat (93) | 93 - 37 | 93 - 37 | No Effect - all thinning in corridor would meet screens | 21 ac. marg. cover present | 21 ac. marg. cover present |
| 3 Travel | 175 - 182 | Veg/Pretreat (154) | Veg/Pretreat (132) | 154 - 88 | 132 - 75 | No Effect - all thinning in corridor would meet screens | 0 | 0 |
| 4 Travel / OGMA | 521 - 530 | Burn/Mow (65), Veg/Pretreat (332) | Burn/Mow (56), Veg/Pretreat (260) | 397 - 76 | 316 - 61 | No Effect - all thinning in corridor would meet screens | 5 ac. marg. | 5 ac. marg. |
| 5 LOS | 138 - 138 | Veg/Pretreat (138) | Veg/ Pretreat (138) | 138 - 100 | 138 - 100 | No Effect - all thinning in corridor would meet screens | 72 ac. good 5 ac. marg. | 72 ac. good 5 ac. marg. |
| 6 LOS | 96 - 96 | Veg/Pretreat (96) | Veg/Pretreat (96) | 96 - 100 | 96 - 100 | No Effect - all thinning in corridor would meet screens | 0 | 0 |
| 7 OGMA / LOS | 518 - 532 | Burn/Mow (228), Veg/Pretreat (171) | Burn/Mow (249), Veg/Pretreat (147) | 399 - 77 | 396 - 76 | No Effect - all thinning in corridor would meet screens | 32 ac. good 56 marg. | 32 ac. good 56 ac. marg. |
| 8 OGMA / LOS | 450 - 456 | Burn/Mow (74), Veg/Pretreat (230) | Burn/Mow (90), Veg/Pretreat (193) | 304 - 68 | 283 - 63 | No Effect - all thinning in corridor would meet screens | 22 ac. good 16 marg. | 22 ac. good 16 ac. marg. |
| 9 OGMA | 96 - 139 | Veg/Pretreat (43) | Veg/Pretreat (36) | 43 - 45 | 36 - 38 | No Effect - all thinning in corridor would meet screens | 9 ac. marg. | 3 ac. marg. |
| 10 Travel / OGMA | 649 - 686 | Burn/mow (56), Veg/Pretreat (329) | Burn/Mow (58), Veg/Pretreat (332) | 385 - 59 | 390 - 60 | No Effect - all thinning in corridor would meet screens | 159 ac. good 37 ac. marg. | 159 ac. good 37 ac marg. |
| 11 OGMA / Travel | 260 - 563 | Burn/Mow (58), Veg/Pretreat (64) | Burn/Mow (32), Veg/Pretreat (82) | 122 - 47 | 114 - 44 | No Effect - all thinning in corridor would meet screens | 9 ac. good 25 ac. marg. | 9 ac. good 25 ac. marg. |
| 12 Travel | 85 - 85 | Burn/Mow (64) | Burn/Mow (64) | 64 - 75 | 64 - 75 | No Effect - all thinning in corridor would meet screens | 13 ac. marg. | 13 ac. marg. |
| 13 LOS | 68 - 68 | Burn/Mow (1) | Veg/Pretreat (4) | 1 - 1 | 4 - 6 | No Effect - all thinning in corridor would meet screens | 0 | 0 |
| 14 Travel | 177 - 177 | None | None | 0 | | No Effect - all thinning in corridor would meet screens | 0 | 0 |
| 15 OGMA / LOS / Travel | 326 - 572 | Veg/Pretreat (4) | Veg/Pretreat (4) | 4 - 1 | 4 - 1 | No Effect - all thinning in corridor would meet screens | 1 ac. marg. | 1 ac. marg. |

[50] Under Alternative 2, 10 percent of the treatment acres within the corridor boundary would be retained as untreated. This increases to 20 percent of the treatment acres under Alternative 3. This applies to all corridors that intersect treatment units under the specific alternatives.

| Corridor ID # | Total Area (net - gross ac.) | Prescriptions (acres) | | Vegetation / Fuels Treatments Acreages/Pct of Corridor) | | LOS / OGMA Connectivity Effect – Both Alts | Deer Cover Effects and Acres Present in Units | |
|---|---|---|---|---|---|---|---|---|
| | | Alt 2 | Alt 3 | Alt 2 | Alt 3 | | Alt $2^{50}$ | Alt $3^{50}$ |
| 16 Travel | 149 - 183 | None | None | 0 | | No Effect - all thinning in corridor would meet screens | 0 | 0 |
| 17 Travel / OGMA | 105 - 105 | Veg/Pretreat (31) | Veg/Pretreat (43) | 31 - 30 | 43 - 41 | No Effect - all thinning in corridor would meet screens | 2 ac. good 3 ac. marg. | 2 ac. good 3 ac. marg. |
| 18 Travel | 108 - 108 | Veg/Pretreat (5) | Veg/Pretreat (5) | 5 - 5 | 5 - 5 | No Effect - all thinning in corridor would meet screens | 0 | 0 |
| 19 OGMA / Travel | 284 - 589 | Veg/Pretreat (27) | Veg/Pretreat (33) | 27 - 10 | 33 - 12 | No Effect - all thinning in corridor would meet screens | 4 ac. good + 14 marg. | 5 ac. good 10 ac. marg. |
| 20 Travel | 274 - 395 | Veg/Pretreat (107) | Veg/Pretreat (46) | 107 - 39 | 46 - 17 | No Effect - all thinning in corridor would meet screens | 35 ac. good + 37 ac. marg. | 11 ac. good 23 ac. marg. |
| 21 Travel / LOS | 163 - 351 | Burn/Mow (75), Veg/Pretreat (29) | Burn/Mow (73), Veg/Pretreat (37) | 104 - 64 | 110 - 67 | No Effect - all thinning in corridor would meet screens | 5 ac. marg. | 11 ac. marg. |
| 22 Travel / LOS | 202 - 414 | Burn/Mow (111) | Burn/Mow (102), Veg/Pretreat (31) | 111 - 55 | 133 - 66 | No Effect - all thinning in corridor would meet screens | 5 ac. marg. | 39 ac. marg. |
| 23 OGMA | 0 - 263 | None (outside) | None (outside) | | | | | |
| 24 Travel | 0 - 199 | None (outside) | None (outside) | | | | | |
| 25 Travel | 210 / 246 | None | | 0 | | | | 0 |
| 26 Travel | 0 / 58 | None (outside) | | | | | | |

**Cumulative Effects –** There are no identified cumulative or cumulatively significant effects associated with any of the current, on-going, or reasonably foreseeable actions in conjunction with any of the three alternatives in this analysis. None of these actions would result in the loss of LOS.

## Summary of Wildlife Species

Table 3-41 displays a partial listing of the wildlife species found in the planning area. It does not include species associated with mixed conifer habitats because there are no mixed conifer plant associations within the planning area. Those species with close ties to both the mixed conifer and either the ponderosa pine or lodgepole pine associations are included.

***Historic Range of Conditions* -** Historic population levels of wildlife species endemic to the planning area are unknown. It is likely that those species that are closely associated with natural disturbance processes (cycles of insect, disease and wildfire) were more common. This is based upon the fact that active management by humans has suppressed wildfires and reduced the frequency of insect and disease epidemics by harvesting the forests to reduce competition among trees. The removal of competing trees and other vegetation has not prevented significant increases in forest density with the lack of frequent, low intensity wildfire.

**Table 3-41 Summary of Selected Wildlife Species, Opine Planning Area**

| Species | Occurrence[51] | Mgmt Indicator Species | FWS Species of Concern[52] | ODFW Sensitive Species | Ecological Indictor Species[53] |
|---|---|---|---|---|---|
| Northern goshawk (NTMB)[54] | U | X | X | X | X (1) |
| Sharp-shinned hawk (NTMB) | U | X | | | (4) |
| Red-tailed hawk (NTMB) | C | X | | | |
| Cooper's hawk (NTMB) | S | X | | | |
| Golden eagle | U | X | BCC (BCR 9) | | (6) |
| *Ferruginous hawk*[55] | U | | X, BCC (BCR 9) | | (7-open country) |
| Great gray owl | R | X | | X | (4,5) |
| *Flammulated owl (NTMB)* | U | | BCC (BCR 9) | X | X (1,2, 4, 5-interspersed grassy openings and thickets) |
| *Lewis's woodpecker (NTMB)* | U-C | X | BCC (BCR 9) | | X (2-large snags, 7-burns) |
| *White-headed woodpecker* | U (declining, local extirpations, BBS) | X | BCC (BCR 9) | X | X (1-PP, 2, 7-sugar pine foraging, large LOS patches) |
| Hairy woodpecker | C | X | | | |
| Three-toed woodpecker | R | X | | X | X (7-burns, higher elevations) |
| *Black-backed woodpecker* | U | X | | X | X (1-LPP, 7-burns) |
| *Williamson's sapsucker (NTMB)* | R (declining, BBS) | X | BCC (BCR 9) | X | X (2-large snags, 7-higher elevations) |
| *Pygmy nuthatch (migratory)* | U | | | X | X (1-PP, 2, 7-large trees) |
| *Brown creeper (migratory)* | U (declining BBS) | | | | X (1-MC, 7-large trees) |
| Green-tailed towhee (NTMB) | U | | | | X (3) |
| *Olive-sided flycatcher (NTMB)* | U-C (declining, BBS) | | X | X | X (1, 2, 7-burns, clearings, edges w / conifers) |
| *Chipping sparrow (NTMB)* | U (declining, BBS) | | | | X (7- open understory w / regenerating pines) |
| *Sage thrasher (NTMB)* | U | | | | X (7-sage and mtn. mahogany) |
| *Loggerhead shrike* | U | | BCC (BCR 9) | X | (7-open woodlands, shrubs) |

[51] *Relative abundance (Opine area only) codes: C = common, U = uncommon, R = rare, S = suspected but not confirmed, i.e. potential habitat available.*

[52] I*ncludes species identified by the 2002 Birds of Conservation Concern (BCC) publication with the applicable Bird Conservation Region (BCR; BCR9 is the Columbia Basin).*

[53] *Special habitat requirements codes: 1 = late and old successional forest (LOS), 2 = snags, 3 = mature shrubs, 4 = dense conifers for nesting/foraging, 5 = meadows or grassy openings for foraging, 6 = special/unique habitats (rock, cliffs, caves, etc.), 7 = other, noted. Abbreviations: LPP = lodgepole pine, PP = ponderosa pine, MC = mixed conifer, CWM = coarse woody material (logs and limbs greater than 3 inches diameter)*

[54] *NTMB = Neotropical migrant bird.*

[55] *Species with **bold/italics** are Focal Species.*

| Species | Occurrence[51] | Mgmt Indicator Species | FWS Species of Concern[52] | ODFW Sensitive Species | Ecological Indictor Species[53] |
|---|---|---|---|---|---|
| *Sage sparrow* | C | | BCC (BCR 9) | | X (3-sage, patchy, large blocks) |
| *Brewer's sparrow (NTMB)* | C-U (declining BBS) | | BCC (BCR 9) | | X (3-sage, high cover) |
| Rocky Mt. elk | U | X | | | (7-grass, shrubs winter range.) |
| Mule deer | C | X | | | (7-shrubs winter range) |
| American marten | U | X | | X | X (1-MC, LPP, 7-CWM concentrations) |
| Townsend's big-eared bat (Pacific western) | S | X | X | X | (3-foraging, 6-caves) |

Based upon these facts, it is likely that species associated with dense, multi-canopied LOS such as the northern goshawk are potentially more plentiful than historically, when the forest had a greater proportion of open, single-story LOS. Conversely, those species that require or prefer the more open structured stands such as the flammulated owl, mountain bluebird, and white-headed woodpecker are potentially less plentiful presently. Species that are highly dependent upon wildfire disturbance such as the black-backed woodpecker, Lewis' woodpecker, and olive-sided flycatcher are also probably less plentiful today.

Snags and coarse woody materials (CWM) such as logs were likely more plentiful historically when wildfire and insect / disease disturbances operated unfettered by human actions. Current management practices of firewood cutting and timber salvage also have served to remove these sources of CWM and help to reduce current levels.

**Management Indicator Species (MIS)**

There are five (5) groups of species designated as management indicator species (MIS) species on the Deschutes National Forest that are identified in the LRMP - waterfowl, woodpeckers, species associated with logs and downed woody debris species associated with various plant communities and successional stages, and species with special or unique habitats. These include the following species: northern goshawk; sharp-shinned hawk, red-tailed hawk; Cooper's hawk; golden eagle; great gray owl; Lewis' woodpecker; white-headed woodpecker; hairy woodpecker; black-backed woodpecker, three-toed woodpecker; Williamson's woodpecker; Rocky Mountain elk; mule deer, American marten; and the Townsend's big-eared (Pacific western) bat. This section will discuss there habitat requirements and effects.

The discussion of the existing conditions related to mule deer and mule deer habitat is at the beginning of this section and is not further discussed here. This section also includes no discussion of Rocky Mountain elk. The conditions described for mule deer and mule deer habitat are assumed to be the same or sufficiently similar for elk. Elk use is limited with use being largely transitional.

The great gray owl is designated as a MIS species on the Deschutes National Forest and its habitat requirements and existing condition will be discussed in this section.

The following table summarizes the current, known population rankings and trend data for Management Indicator Species, Focal species, and sensitive species that will be assessed for project effects.

**Table 3-42: Opine Project Species Status/Population Trend Summary**

| Species | LRMP/Other Designation | FWS Status (BCR 9) | State of Oregon Status | NatureServe Ranking/ONHP ranking (OSU) | BBS Trend/Notes |
|---|---|---|---|---|---|
| Mule deer | MIS | NA | Game species | NA/NA | NA/Declining, North Paulina Sub-Herd Unit |
| Greater sage-grouse | N.A./R6 Sensitive | SOC (Columbia Basin) | SV in East Cascades | G4, S3/4 | Positive (non-significant)/status varies with locale |
| Cooper's hawk | MIS | NA | NA | G5, S4/NA | Positive (significant) |
| Sharp-shinned hawk | MIS | NA | NA | G5, S4/NA | Positive (significant) |
| Northern goshawk | MIS | SOC | SC | G5, S3/4 | Positive (non-significant) |
| Golden eagle | MIS | SOC | NA | G5, S4/NA | Positive (significant) |
| Red-tailed hawk | MIS | NA | NA | G5, S5/NA | Positive (significant) |
| American peregrine falcon | MIS/R6 Sensitive | SOC | LE | G4T3, S2B/2 | Positive (non-significant)/delisted from ESA |
| Great gray owl | MIS/S&M (west of owl line)/R6 Sensitive (WA state only) | NA | SV | G5, S3/4 | Not Rated |
| Lewis'woodpecker | MIS/Focal | SOC | SC | G4, S2/2 | Negative (non-significant) |
| White-headed woodpecker | MIS/Focal | SOC | SC | G4, S2/2 | Positive (significant)/ |
| Black-backed woodpecker | MIS/Focal | NA | SC | G5, S3/4 | Positive (significant) |
| Hairy woodpecker | MIS | NA | NA | G5, S4/NA | Positive (non-significant) |
| Williamson's sapsucker | MIS/Focal | SOC | NA | G5, S4/NA | Negative (non-significant) |
| American (pine) marten | MIS | NA | SV | G5, S3/4 | NA |
| Pygmy rabbit | NA/R6 sensitive | NA | SV | S4, S2?/2 | NA |
| Townsend's big-eared bat | MIS/R6 Sensitive (WA state only) | SOC | SC | G4, S2/2 | NA/declining locally |

**References:** Oregon Natural Heritage Program, "Rare and Endangered Plants and Animals of Oregon", http://oregonstate.edu/omhic/omhp.html, (2004); NatureServe Explorer web site, www.natureserve.org/explorer/, (2007); ODFW "Oregon Sensitive Species List" (2004); Fish and Wildlife Service, "Birds of Conservation Concern" (2002); Forest Service, "Regional Forester's Sensitive Species List" (2004); Deschutes National Forest Land and Resources Management Plan (1990); Northwest Forest Plan, USFS, Region 6 (and associated amendments) (1994); B. Altman "Conservation Strategy for Landbirds of the East-Slope of the Cascade Mountains in Oregon and Washington (2000); USGS, Patuxent Wildlife Research Center, "First Public Version of 1966-2005 BBS Analysis Website", www.mbr-pwrc.usgs.gov/bbs/, (2007); personal communication Glen Ardt, ODFW (2006); and Bend-Ft. Rock Ranger District bat survey records (files, multi-year). **Notes:** G2 = imperiled, G3 = vulnerable, G4 = apparently secure, G5 = secure (global ratings); S2 = imperiled, S3 = vulnerable, S4 = apparently secure, S5 = secure (Oregon, State ratings); 1 = critically imperiled, 2 = imperiled, 3 = rare, uncommon or threatened, 4 = apparently secure, 5 = abundant, secure (Oregon, State ratings); SC = State Critical, SV = State Vulnerable (ODFW classifications); NA = not applicable, MIS = management indicator species, S&M = survey and manage, SOC = species of concern, BCR9 = bird conservation region, Great Basin, BBS = breeding bird survey, ONHP = Oregon Natural Heritage Program.

**MIS Summary** – Table 3-43 broadly summarizes the expected effects of the two action alternatives on MIS species or their habitat in the planning area. MIS species not considered to occupy the planning area include the bald eagle, the northern spotted owl, the great blue heron, three-toed woodpecker, wolverine, peregrine falcon, and osprey.

**Table -3-43 Effects of Proposed Vegetation and Fuel Reduction Treatments on MIS Species and Their Habitats**

| MIS | Project Treatments Effects[56] – Alternatives 2 and 3 | | |
|---|---|---|---|
| | Prescribed Fire/Mowing | Tree Thinning | Mitigation Measures |
| *Raptors* | | | |
| Northern Goshawk | -, M(0) | -- ST, M(-) | Protect solitude at nests. Implement prescriptions with goshawk habitat objectives. |
| Sharp-shinned hawk | -, M(0) | -- ST, M(-) | Protect solitude at nests. Retain dense patches for potential nesting. |
| Red-tailed hawk | 0 | 0 | Protect solitude at nests. |
| Cooper's hawk | 0 | -, M(0) | Protect solitude at nests. |
| Golden eagle | 0 | + | Protect solitude at nests. |
| Great gray owl | 0 | - , M(0) | Retain dense LPP LOS patches near large forest openings and meadows |
| *Cavity Nesters* | | | |
| Lewis' woodpecker | + | + | Protect snags. Retain burnt trees/snags for foraging. |
| White-headed woodpecker | + | + | Retain scattered understory patches for foraging. Protect snags. |
| Black-backed woodpecker | + | -, M(0) | Retain burnt trees/snags for foraging. Protect snags. |
| Williamson's sapsucker | 0 | 0 | Protect snags and logs (foraging). |
| Hairy woodpecker | + | + | Protect snags and logs. |
| *Others* | | | |
| Rocky Mountain elk | - to + | - to + | Road density will negatively affect elk. |
| Mule deer | -, M(0) | --, M(-) hiding cover | Thinning will negatively affect thermal cover even with mitigation. Road density will negatively affect deer. Provide movement corridors between cover patches. |
| American marten | --, M(-) | -, M(0) | Protect down logs and provide corridors for movement between habitat patches (LPP). |
| Townsend's big-eared bat | -, M(0) | + | Protect caves and lava tubes |
| Species associated with logs and downed woody debris | --, M(-) | - | Protect features |
| Species associated with various plant communities and successional stages | - to + | - to + | Promotion of seral stage 7 will be a beneficial effect. Elimination of dense stands/patches will be a negative effect. Provide habitat connections for LOS dependent species. |
| Species with special or unique habitats | -, M(0) | -, M(0) | Protect features |

Regardless of the activity, fuel reduction, vegetation treatment, or a combination of both, the application of the mitigation measures would generally eliminate or substantially reduce the projected adverse impacts to MIS species within the planning area. The relatively small scale of the project relative to the range of the species, it is expected that even unmitigated effects would not likely affect the population viability of any of these species.

[56] A"+" denotes a positive effect. A"-" denotes a minor negative effect. A "—" denotes a major negative effect. A "0" denotes a neutral effect. Short-term effects are denoted by "ST"; long-term effects by "LT". "M" denotes mitigation and the ( ) with either a +, -, or 0 denotes whether the mitigation changes the impacts to positive (+), a small negative (-), or a neutral effect (0).

**Habitat / Effects:**

***Raptors –*** This group includes the sharp-shinned, Cooper's, and red-tailed hawks, the northern goshawk, the great gray owl, and the golden eagle. Of these species, the northern goshawk, red-tailed hawk, and the golden eagle have been documented within the planning area. There are active or recently active nests for at least the northern goshawk and golden eagle. Surveys have located one (1) known and one (1) potential goshawk nest sites. Historic and recently active golden eagle sites have also been documented by surveys. Potential habitat exists within the planning area for the Cooper's, red-tailed and sharp-shinned hawks and the great gray owl. No nest sites for these species have been documented in any of the units.

***Northern Goshawk*** **–** A 30 acre nest stand of the most suitable nesting habitat and a 400 acres post fledgling area (PFA) has been established around the known goshawk nest site as per direction in the Interim Wildlife Standards of the Eastside Screens. The PFA has incorporated suitable alternative and future replacement nest stands. Additional information regarding habitat for this species, and specifically regarding the nest stand and PFA, can be found in the management plan for the nest site area.

Forest-wide S&G WL-9 (LRMP page 4-53) defines nesting habitat for this species as having a mean canopy cover of 60 percent or greater; a tree density of at least 195 trees per acre, a stand size of at least 25 acres, and a stand age of 100 years or greater.

The 1995 Eastside Screens amended the LRMP S&Gs for the northern goshawk. LRMP direction for this species requires maintaining nest habitat for at least 40 pairs across the Forest. It does not describe how the pairs are or would be distributed across the Forest. If distributed equally between the three ranger districts, this would require habitat for 13 to 14 pairs on the Bend-Fort Rock Ranger District. However, based on land area, the Bend-Fort Rock Ranger District would be required to maintain habitat for 23 pairs.

Reasonable estimates of potential nesting habitat were made utilizing data generated by the assessments of LOS and deer thermal cover for this species. These include:

- 5,220 acres of stage 6 ponderosa pine LOS;
- 644 acres of stage 7 ponderosa pine LOS;
- 16,204 acres of stage 5 (young, multi-story) ponderosa pine;
- 2,417 acres with canopy closures in excess of 30 percent including 485 acres with canopy closures of 40 percent or greater and 1,932 acres of canopy closures ranging from 30 to 39 percent; and
- an unknown, but very limited amount of acres with canopy closures of 60 percent or greater.

Current habitat conditions are nearly ideal for the northern goshawk within the nest core/post-fledgling area. Dense understory stocking that is competing with the larger overstory ponderosa pine may eventually place the larger trees at risk to insect and disease vectors. In addition, the understory is creating a high risk level for a catastrophic fire due to ladder fuels and dense canopy conditions. The "***Pine Mountain Goshawk Raptor Site Plan***" has additional information including objectives and desired future condition descriptions. A copy is available at the Bend-Fort Rock Ranger District.

Surveys have located one active northern goshawk nest site on Pine Mountain. A probable, but unconfirmed site is located near Plot Butte.

Table 3-44 summarizes habitat conditions for the known goshawk site on Pine Mountain.

**Table 3-44 Current Habitat Conditions at the Pine Mountain Goshawk Site**

| Nest Site ID | Nest Core Habitat (30 ac.) | | | Post-Fledgling Area Habitat (400 ac.) | | |
|---|---|---|---|---|---|---|
| | PAG | Structure (ac.) | Density[57] (ac.) | PAG | Structure (ac.) | Density (ac.) |
| *NGH Site# (undesignated)* | *PPD 100 %* | *SS4 / 10; SS6 / 20* | *H = 30 ac.* | *PPD 100%* | *SS2 / 3; SS3 / 45; SS4 / 44; SS5 / 33; SS6 / 254; SS7 / 21.* | *L = 81; M = 82; H = 240* |

Treatments would reduce the risk of existing and potential habitat being lost to insect epidemic and/or wildfire events. Habitat quality would be expected to improve due to increased diameter growth resulting from reduced stand stocking levels. The objective of developing more LOS habitat also often results in the best potential nesting habitat. The combination of reduced risk of loss or damage, increased diameter growth, and increased development of LOS habitat would assist in creating greater quantities of more stable habitat in the future. This would result in more stable populations of this species and a lowered risk of displacement in the event of habitat loss from insect epidemic and/or wildfire events.

Alternative 1 would have no short-term effect on either the habitat or population of this species. No treatments would be implemented within the 30 acre nest stand nor the 400 acre post fledgling area. Suitable habitat would be maintained. Assuming no disturbance by wildfire and/or insects, the essential habitat components (nesting and foraging) for the goshawk site would be maintained because canopy cover levels would not change over the short-term (10-15 years). However, over the long-term (10 to 15 years and longer), the risk of wildfire and/or bark beetle attack would continue to increase thereby placing this habitat at risk of partial or complete loss. This would reduce or eliminate the habitat of bird species that are potential prey for the goshawk.

Stands within these areas currently rated at high risk to bark beetle attack or wildfire would remain at high risk. Long-term, the risk of loss of existing habitat to either bark beetle attack and/or wildfire would remain. Loss of nesting habitat could displace this species from the area. In the event of a catastrophic wildfire, it would take decades for nesting habitat to return.

Maintaining existing and potential habitat with high tree density increases the risk of losing that habitat. Potential nesting habitat is limited in the planning area (comparing acres of potential habitat to total acres) and is likely limited on the landscape. The effect of losing existing and potential habitat in the planning area would be a reduction in population of this species over the affected landscape. It is likely that potential habitats in the adjacent planning areas are already part of an occupied territory; any displaced birds would have to travel long distances to establish new territories.

Populations would remain stable only in the absence of natural disturbances such as beetle outbreak and wildfire. It is more likely that there would be a declining trend in populations as a result of habitat loss due to natural disturbances.

Table 3-45 summarizes the proposed treatments and their expected effects for both action alternatives. Due to overlapping vegetation and fuel reduction treatments, treated acres will not equal gross acres.

[57] Density = canopy cover. L = canopy cover of less than 25 percent; M = canopy cover of 25-34 percent; and H = canopy cover of 35 percent or greater.

**Table -3-45 Effects of Vegetation and Fuel Reduction Treatments on the Known Goshawk Site**

| | Nest Site ID | Gross Acres | Units | Prescriptions | Treated Acres | Effects |
|---|---|---|---|---|---|---|
| Alt. 2 | N. goshawk Nest Core | 30 | H09<br>SD02<br>F09 | MTT<br>STT<br>Pre-Treat/Burn | 20<br>10<br>30 | Fuels treatments overlap veg units. Prescriptions were not designed for goshawk objectives. Treatments will negatively affect (reduce) canopy cover. 100% treated. |
| | N. goshawk PFA | 400 | H09<br>P07<br>P08<br>SD02<br>SD08<br>F9, 17, 36<br>F35 | MTT<br>STT<br>STT<br>STT<br>STT<br>Pre-treat/Burn<br>Pre-treat/Mow | 100<br>72<br>7<br>37<br>14<br>391<br>10 | Fuels treatments overlap veg units. Prescriptions were not designed for goshawk objectives. Treatments will negatively affect (reduce) canopy cover, and understory stand structure for prey species. 100% treated. |
| Alt. 3 | N. goshawk Nest Core | 30 | P346<br>F09 | STT<br>Pre-treat/Burn | 30<br>30 | Fuels treatments overlap veg units. Short-term there would be potential negative effects (reduce) on canopy cover, and understory stand structure for prey species. 100% treated. |
| | N. goshawk PFA | 400 | P309<br>P315<br>P324<br>P346<br>F09, 17, 36<br>F35 | STT<br>STT<br>STT<br>STT<br>Pre-treat/Burn<br>Pre-treat/Mow | 45<br>157<br>14<br>148<br>384<br>13 | Fuels treatments overlap veg units. Short-term there would be potential negative effects (reduce) on canopy cover. 100% treated. |

Project design criteria, specifically NG3 and NG6, impose seasonal restrictions when the nest is occupied and do not permit commercial harvest within the 30 acre nest area. Treatments, non-commercial thinning and burning of piles, are proposed within the known nest stand with the objective of providing long-term habitat viability.

The effects of treatments from Alternative 2 on the goshawk site are not conducive to the long-term maintenance of essential habitat components (i.e. nesting and foraging) because canopy levels are too low and do not retain mid-story trees for multi-layer structure. Prescriptions were not designed considering goshawk objectives resulting in residual canopy cover levels becoming too low. The elimination of small tree clumps in the understory would reduce habitat of bird species that are potential prey for goshawks.

The effects of treatments from Alternative 3 on northern goshawk nest sites are negative in the short-term. Prescriptions were designed considering goshawk objectives. However, overall canopy cover would be reduced and the stand structure simplified. Unthinned retention patches would mitigate these effects. There would be no effects on existing or potential nest trees; these trees would be retained.

In the long-term (15 years and longer) the treatments would reduce competition among trees and reduce the probability of large tree mortality due to insects and/or disease. The reduction of understory ladder fuels and the overall canopy coverage would reduce the probability of catastrophic wildfire. The prescriptions for thinning and natural fuels reductions have been designed to mitigate the short-term effects and promote long-term stand structural characteristics favorable to goshawk.

Both alternatives would affect potential nesting habitat that is currently unoccupied. Potential habitat is usually those plant associations that are also currently those at highest risk to insect epidemic; specifically bark beetles, and wildfire. Both alternatives propose a variety of treatments, including commercial and non-commercial harvest as well as fuel pretreatment that would reduce stand densities, and in the short-

term, simplify stand structures to the extent that they would not provide the characteristics of optimal nesting habitat. Treatments on Pine Mountain are predicated on the premise that re-treatments would not be required for at least 20 to 30 years. It is therefore reasonable to assume that canopy closure levels and structural diversity would increase to the point of providing optimal nesting habitat at or near that time. Thinning prescriptions and tree marking guidelines would target for removal disease trees, particularly those with dwarf mistletoe, that provide nesting structure such as brooms or forked tops.

The application of prescribe fire would also result in reductions in stand densities but the effects would be less. Burning would be limited to piling and burning or the burning of jackpot concentrations of fuels. No burning would be applied in retention patches under either alternative.

Regardless of the treatment, resulting stands would provide good foraging habitat following treatment. Small and medium tree thinning would create more open stand conditions which allow for greater maneuverability as well as greater visibility and access to prey species. Mechanical shrub treatments and the application of prescribe fire would promote greater plant diversity thereby providing habitat for a wider variety of birds and small mammals.

Long-term, more than 30 years, habitat would become more stable and be of a higher quality with a lower risk of damage or loss due to insect epidemic or uncharacteristic wildfire. The population of this species would then become stable.

Additional potential nesting habitat would be provided by the retention patches proposed under these two alternatives. Alternative 3, because it provides for 20 percent of the unit acreage to be retained in an untreated condition, would provide more potential habitat than Alternative 2 which would retain only 10 percent of each unit in an untreated condition.

Alternative 3 treats more acres of existing or potential habitat than Alternative 2 and therefore results in more short-term negative effects (loss of structural diversity, disturbance, reduction in canopy closure). Treatment prescriptions proposed in Alternative 3 for the nest stand and the PFA were developed with goshawk objectives in mind. This is not true for Alternative 2.

With the exception of vegetation and fuel reduction treatments proposed or implemented in adjacent planning areas, none of the current, on-going, or reasonable and foreseeable actions would have any cumulative or cumulatively significant effects on this species or its habitat. None of these actions would damage or remove habitat.

The effect of Alternative 1 would be the potential population reduction of the species over this portion of the landscape in the long-term. Maintaining existing and potential habitat with high tree densities increases the risk of losing that habitat to insect epidemic and/or wildfire events. Adjacent areas, including areas with recent, on-going, or proposed vegetation and fuel reduction projects that contain potential or existing habitat are already part of occupied territories. Therefore, any birds displaced due to habitat losses associated with insect or wildfire events would likely have to travel long distances to locate unoccupied habitat and established new territories.

The cumulative effect of implementing Alternatives 2 and 3 would be the short-term reduction in the quantity, quality, and distribution of nesting habitat associated with dense stands that are also at high risk of loss due to bark beetle attack and/or wildfire events. Conversely, the quantity, quality, and distribution of foraging habitat associated with more open stand conditions would increase as a result of vegetation and fuel reduction treatments. Treatments have been or are nearly completed in the adjacent Fuzzy planning area. This scheduling of planning and implementation would spread treatments out over an extended period that could last 10 to 15 years or more resulting in habitat being developed relatively

continuously during that period, but over a landscape rather than a smaller area. Existing populations would have opportunities to move both spatially and temporally around the landscape.

No cumulatively significant effects have been identified for this species or its habitat under any of the three alternatives.

Goshawks have an average territory size of about 10,000 acres, which if mapped as a circle would represent an area with a radius of ~ 7 miles. Therefore, given the low density of this species an assessment area 14 miles distant from the Opine project boundary would seem appropriate. Mixed conifer and moist ponderosa pine late-successional forests are preferred habitats, although forest structure appears to be more limiting to goshawk habitat rather than stand composition (Reynolds et al. 1991). A variety of earlier forest seral stages are considered potential foraging habitat.

There would be no cumulative effects associated with the No Action alternative. There are no mixed conifer habitats within the Opine planning, and the existing LOS stands would not be altered by any management actions.

Past effects in the area include Paulina wildfire (1988) approximately four miles west of the project boundary, which had the most substantial negative impact on goshawk habitat in the area. However the area was dominated by lodgepole pine forest and not likely high quality habitat for goshawk, particularly for nesting. The area has not recovered enough to provide any benefits to goshawks. The remaining area has been managed for timber production for many decades and provides a wide array of habitat conditions. The amount of mixed conifer LOS habitat in this area is unknown.

Surveys for goshawks in this area have located 19 nest sites. This data is not current, however, because follow-up nest monitoring has not been done. The LRMP has a goal of managing for 40 pairs of goshawks across the entire Forest. The assessment area is approximately 500,000 acres in size or about 31 percent of the entire Forest's area. Therefore, it should be providing about 12 goshawk pairs, assuming that it is all suitable habitat (i.e. mixed conifer, LOS), which it is not. In comparison, the Opine project area represents about 3 percent of the total Forest area and should have 1.35 pairs of goshawks. Presently, there is one confirmed pair, plus one suspected pair present within the project. In summary, though lacking quantitative habitat data, it would appear that the number of desired goshawk pairs are present, and there are apparently no adverse cumulative effects impacting goshawks at this scale.

Because neither Opine action alterative is altering any late successional forest stages, they are not contributing to the cumulative effects on potential goshawk nesting habitat. Past projects in the area have retained patches of non-treated forest for big game cover, which could potential be utilized by goshawks. In addition, there are no preferred mixed conifer habitat types within the potential territories near the project or within it. There are eight designated Old Growth Management Areas to the west of the project and two within the project, which provide adequate potential nesting habitats for goshawks in the area.

Past fuels treatment projects in the project area (~5000 acres since 1990; 9 percent of project area) have been limited to reducing shrub habitats. These areas are likely providing a lower quality habitat for potential goshawk prey species. However, as noted the goshawk has a large territory and is very mobile, which reduces potential negative effects at the local scale. The action alternatives propose substantial treatment acreages of shrubs and understory coniferous trees. Mitigation measures to retain a minimum percentage of shrubs and young trees for deer should also provide habitat for potential goshawk prey species. Fuel treatments are designed to reduce ladder fuels which can increase the probability of catastrophic crown fires. Such fires would have long-term negative effects on both nesting and foraging habitats for goshawks.

The cumulative effect of the proposed treatments, past treatments, and foreseeable treatments within and adjacent to the planning area, is a short-term, downward trend in the overall amount of dense high risk stands potentially used for nesting by the northern goshawk, but an upward trend in the amount of open stand conditions more suitable as potential foraging habitat. Any known nest sites within the planning area is protected from disturbance (see PDCs) with nest core areas designated and deferred from treatment; this would also be the case in the adjacent planning areas.

Through time, additional nesting habitat will develop within the project and be at a lower risk to wildfire and beetle-induced mortality and of higher quality because of increased diameter growth due to thinning. In conjunction with current management objectives to develop more LOS habitat (often the best potential nesting habitat), this will help in creating more stable habitat amounts in the future. The result is more stable populations of goshawks throughout the landscape, and a lowered risk of displacement.

Cumulatively, the action alternative effects on nesting and foraging habitats will not lead to a trend toward Federal listing for the northern goshawk.

***Cooper's Hawk*** - Forest-wide S&G WL-17 (LRMP page 4-53) defines nesting habitat for this species as having a mean canopy cover of 60 percent or greater; a tree density of at least 365 trees per acre, a stand size of at least 15 acres, and a stand age of 50 to 80 years.

Habitat estimates for this species within the planning area are the same as for the northern goshawk and were made using the same information and methodologies. The LRMP requires habitat for 60 pairs across the Forest. With no direction in the LRMP for distribution of those pairs, equal distribution across the three ranger districts would require habitat for 20 pairs on the Bend-Fort Rock Ranger District. Based on land area, the Bend-Fort Rock Ranger District would require habitat for 35 pairs.

Field surveys have detected no nests of this species within the planning area.

Alternative 1 would have no short-term effect on either the habitat or population of this species. Stands currently rated at high risk to bark beetle attack or wildfire would remain at high risk. Long-term, the risk of loss of existing habitat to either bark beetle attack and/or wildfire would remain. Loss of nesting habitat could displace this species from the area. In the event of a catastrophic wildfire, it would take decades for nesting habitat to return.

Maintaining existing and potential habitat with high tree density increases the risk of losing that habitat. Potential nesting habitat is limited in the planning area (comparing acres of potential habitat to total acres) and is likely limited on the landscape. The effect of losing existing and potential habitat in the planning area would be a reduction in population of this species over the affected landscape. It is likely that potential habitats in the adjacent planning areas are already part of an occupied territory; any displaced birds would have to travel long distances to establish new territories.

Populations would remain stable only in the absence of natural disturbances such as beetle outbreak and wildfire. It is more likely that there would be a declining trend in populations as a result of habitat loss due to natural disturbances.

Both alternatives would affect potential nesting habitat. Potential habitat is usually those plant associations that are also currently those at highest risk to insect epidemic; specifically bark beetles, and wildfire. Both alternatives propose a variety of treatments, including commercial and non-commercial harvest as well as fuel pretreatment that would reduce stand densities, and in the short-term, less than 20 years, simplify stand structures to the extent that they would not provide the characteristics of optimal nesting habitat. Thinning prescriptions and tree marking guidelines would target for removal disease

trees, particularly those with dwarf mistletoe, that provide nesting structure such as brooms or forked tops.

The application of prescribe fire would also result in reductions in stand densities, but the effects would be less of an affect on structure and canopy cover than thinning.

Regardless of the treatment, resulting stands would provide good foraging habitat following treatment. Small and medium tree thinning would create more open stand conditions which allow for greater maneuverability as well as greater visibility and access to prey species. Mechanical shrub treatments and the application of prescribe fire would promote greater plant diversity thereby providing habitat for a wider variety of birds.

Long-term, more than 20 years, habitat would become more stable and be of a higher quality with a lower risk of damage or loss due to insect epidemic or uncharacteristic wildfire. The population of this species would then become stable.

Additional potential nesting habitat would be provided by the retention patches proposed under these two alternatives. Alternative 3, because it provides for 20 percent of the unit acreage to be retained in an untreated condition, would provide more potential habitat than Alternative 2 which would retain only 10 percent of each unit in an untreated condition.

Alternative 3 would result in more acres of existing or potential habitat being degraded or eliminated than does Alternative 2.

With the exception of vegetation and fuel reduction treatments proposed or implemented in adjacent planning areas, none of the current, on-going, or reasonable and foreseeable actions would have any cumulative or cumulatively significant effects on this species or its habitat. None of these actions would damage or remove habitat.

The cumulative effects vegetation and fuel reduction treatments on this species and its habitat are the same as described for the northern goshawk.

No cumulatively significant effects have been identified for this species or its habitat under any of the three alternatives.

The action alternatives would directly affect potential nesting habitat of the Cooper's hawk as noted earlier. The types of forested stands in which these species prefer to nest are usually those plant associations that pose the highest risk to insect epidemics and wildfire found in the planning area due to tree density; the action alternatives propose treatments in these types of stands. Treatments, including: selective harvest, commercial thinning, seed tree harvest, partial removal, and pre-commercial thinning (including fuels pre-treatments) would reduce stand densities and, in the short-term, simplify stand structure to the extent that these stands would not provide the characteristics of optimum nesting habitat. Prescribed fire would also reduce tree density, but it would be much less impacting. In addition to the previously mentioned effects, the prescriptions and tree marking guidelines would target removal of disease, primarily mistletoe infected trees, that provide nesting structure (e.g. mistletoe brooms or forked tops). Treated stands would still provide foraging habitat for these species post- treatment. The Opine project will treat approximately 2059 acres (35 percent of SS6 and 33 percent of SS7) acres of ponderosa pine habitat in stages 6 and 7 by Alternative 2 and approximately 2560 acres (44 percent of SS6 and 37 percent of SS7) by Alternative 3. The project will also impact approximately 13 percent (709 ac.) of the lodgepole pine (stages 4-7) with Alternative 2 and approximately 15 percent (804 ac.) with Alternative 3.

Cover patches retained for mule deer (i.e. 10 percent in Alternative 2 and 20 pecent in Alternative 3) would provide potential nesting habitat for Cooper's hawks. Alternative 3 would result in more acres of potential habitat degraded or eliminated than Alternative 2. Additionally, the PDCs would protect any discovered nesting sites of Cooper's hawks. Seasonal restrictions would also prevent disturbance during the breeding seasons of newly discovered active nests.

The indirect effect of the action alternatives is to improve foraging habitat of the Cooper's hawk. The commercial harvest and pre-commercial thinning treatments would create more open stand conditions, allowing greater maneuverability and greater visibility and access to prey, while mechanical shrub treatment and prescribed under burning would promote greater plant diversity, providing habitat for a wider variety of birds, the primary prey of the Cooper's hawk, and small mammals.

There would be long-term benefits to this species by treating potential habitat. Reducing the risk of beetle-induced mortality and wildfire in forested stands will help develop and maintain potential habitat in the planning area. Short-term (<20 years) negative effects of habitat degraded or eliminated by harvest treatments will give way to long-term benefits of more stable higher quality habitat at lower risk to insect epidemics and wildfire.

For this raptor species, the cumulative effect of the proposed treatments, past treatments, and foreseeable treatments within and adjacent to the planning area, is a short-term, downward trend in the overall amount of dense high risk stands currently used for nesting by the Cooper's hawk, but an upward trend in the amount of more open stand conditions that would provide suitable foraging habitat. As noted in the preceding section on the northern goshawk the nearby Paulina fire has had the most significant effect upon habitats for Cooper's hawk outside of the project area, which has still not recovered. Past timber harvest and other stand thinning activities have reduced the amount and quality of potential nesting habitat for this species in the area. However, retention cover patches for big game, movement/LOS corridors, untreated areas (e.g. steep slopes of buttes), and allocated Old Growth Management Areas still provide adequate potential nesting habitats for this species.

Through time, additional nesting habitat will develop and be of higher quality because of increased diameter growth of trees due to thinning. The result should be a more stable population of this species throughout the landscape, and a lowered risk of displacement by catastrophic wildfire or epidemic insect/disease mortality of trees. Cumulatively, the action alternative effects on nesting and foraging habitats will not lead to a trend toward Federal listing for the Cooper's hawk.]

***Sharp-shinned Hawk*** - Forest-wide S&G WL-25 (LRMP page 4-54) defines nesting habitat for this species as having a mean canopy cover of 65 percent or greater; a tree density of at least 475 trees per acre, a stand size of at least 10 acres, and a stand age of 40 to 60 years.

Habitat estimates for this species within the planning area are the same as for the northern goshawk and were made using the same information and methodologies. The LRMP requires habitat for 60 pairs across the Forest, the same as for the Cooper's hawk. The number expected on the Bend-Fort Rock Ranger district would also be the same as the Cooper's hawk; habitat for 20 pair with equal distribution and 35 pair based on land area.

Field surveys have detected no nests of this species within the planning area.

Alternative 1 would have no short-term effect on either the habitat or population of this species. Stands currently rated at high risk to bark beetle attack or wildfire would remain at high risk. Long-term, the risk of loss of existing habitat to either bark beetle attack and/or wildfire would remain. Loss of nesting

habitat could displace this species from the area. In the event of a catastrophic wildfire, it would take decades for nesting habitat to return.

Maintaining existing and potential habitat with high tree density increases the risk of losing that habitat. Potential nesting habitat is limited in the planning area (comparing acres of potential habitat to total acres) and is likely limited on the landscape. The effect of losing existing and potential habitat in the planning area would be a reduction in population of this species over the affected landscape. It is likely that potential habitats in the adjacent planning areas are already part of an occupied territory; any displaced birds would have to travel long distances to establish new territories.

Populations would remain stable only in the absence of natural disturbances such as beetle outbreak and wildfire. It is more likely that there would be a declining trend in populations as a result of habitat loss due to natural disturbances.

Neither action alternative affects known nest sites; there are no known sites in the planning area.

Both alternatives would affect potential nesting habitat. Potential habitat is usually those plant associations that are also currently those at highest risk to insect epidemic; specifically bark beetles, and wildfire. Both alternatives propose a variety of treatments, including commercial and non-commercial harvest as well as fuel pretreatment that would reduce stand densities, and in the short-term, less than 30 years, simplify stand structures to the extent that they would not provide the characteristics of optimal nesting habitat. Thinning prescriptions and tree marking guidelines would target for removal disease trees, particularly those with dwarf mistletoe, that provide nesting structure such as brooms or forked tops.

The application of prescribe fire would also result in reductions in stand densities, but the effects would be less of an affect on structure and canopy cover.

Regardless of the treatment, resulting stands would provide good foraging habitat following treatment. Small and medium tree thinning would create more open stand conditions which allow for greater maneuverability as well as greater visibility and access to prey species. Mechanical shrub treatments and the application of prescribe fire would promote greater plant diversity thereby providing habitat for a wider variety of birds.

Long-term, more than 30 years, habitat would become more stable and be of a higher quality with a lower risk of damage or loss due to insect epidemic or uncharacteristic wildfire. The population of this species would then become stable.

Additional potential nesting habitat would be provided by the retention patches proposed under these two alternatives. Alternative 3, because it provides for 20 percent of the unit acreage to be retained in an untreated condition, would provide more potential habitat than Alternative 2, which would retain only 10 percent of each unit in an untreated condition.

Alternative 3 would result in more acres of existing or potential habitat being degraded or eliminated than does Alternative 2.

With the exception of vegetation and fuel reduction treatments proposed or implemented in adjacent planning areas, none of the current, on-going, or reasonable and foreseeable actions would have any cumulative or cumulatively significant effects on this species or its habitat. None of these actions would damage or remove habitat.

The cumulative effects vegetation and fuel reduction treatments on this species and its habitat are the same as described for the northern goshawk.

No cumulatively significant effects have been identified for this species or its habitat under any of the three alternatives.

The action alternatives would directly affect potential nesting habitat of the sharp-shinned hawk as noted earlier. The types of forested stands in which these species prefer to nest are usually those plant associations that pose the highest risk to insect epidemics and wildfire found in the planning area due to tree density; the action alternatives propose treatments in these types of stands. This hawk prefers nesting clumps of trees denser than those utilized by goshawks or Cooper's hawks. The trees are generally a smaller size class as well. Treatments, including: selective harvest, commercial thinning, seed tree harvest, partial removal, and pre-commercial thinning (including fuels pre-treatments) would reduce stand densities and, in the short-term, simplify stand structure to the extent that these stands would not provide the characteristics of optimum nesting habitat. Prescribed fire would also reduce tree density, but it would be much less impacting. In addition to the previously mentioned effects, the prescriptions and tree marking guidelines would target removal of disease, primarily mistletoe infected trees, that provide nesting structure (e.g. mistletoe brooms or forked tops). Treated stands would still provide foraging habitat for these species post- treatment. The Opine project will treat approximately 2059 acres (35 percent of SS6 and 33 percent of SS7) acres of ponderosa pine habitat in stages 6 and 7 by Alternative 2 and approximately 2560 acres (44 percent of SS6 and 37 percent of SS7) by Alternative 3. The project will also impact approximately 13 percent (709 ac.) of the lodgepole pine (stages 4-7) with Alternative 2 and approximately 15 percent (804 ac.) with Alternative 3.

Cover patches retained for mule deer (i.e. 10 percent in Alternative 2 and 20 percent in Alternative 3) would provide potential nesting habitat for sharp-shinned hawks. Alternative 3 would result in more acres of potential habitat degraded or eliminated than Alternative 2. Additionally, the PDCs would protect any discovered nesting sites of sharp-shinned hawks. Seasonal restrictions would also prevent disturbance during the breeding seasons of newly discovered active nests.

The indirect effect of the action alternatives would likely diminish the quality of some foraging habitats for this species. Prey species birds that utilize denser coniferous forest that would be more open post-treatment may have lower densities of these species. Birds that utilize more open stands should increase and be available to sharp-shinned hawks. Mechanical shrub treatment and prescribed under burning would promote greater plant diversity, providing habitat for a wider variety of birds, the primary prey of the sharp-shinned hawk.

There would be long-term benefits to this species by treating potential habitat. Reducing the risk of beetle-induced mortality and wildfire in forested stands will help develop and maintain potential habitat in the planning area. Short-term (<20 years) negative effects of habitat degraded or eliminated by harvest treatments will give way to long-term benefits of more stable higher quality habitat at lower risk to insect epidemics and wildfire.

For this raptor species, the cumulative effect of the proposed treatments, past treatments, and foreseeable treatments within and adjacent to the planning area, is a short-term, downward trend in the overall amount of dense high risk stands currently used for nesting by the sharp-shinned hawk. As noted in the preceding section on the northern goshawk the nearby Paulina fire has had the most significant effect upon habitats for sharp-shinned hawk outside of the project area, which has still not recovered. Past timber harvest and other stand thinning activities have reduced the amount and quality of potential nesting habitat for this

species in the area. However, retention cover patches for big game, movement/LOS corridors, untreated areas (e.g. steep slopes of buttes), and allocated Old Growth Management Areas still provide adequate potential nesting habitats for this species. Sharp-shinned hawks can better utilize the small retention patches than either the Cooper's hawk or goshawk.

Through time, additional nesting habitat will develop and be of higher quality because of increased diameter growth of trees due to thinning. The result should be a more stable population of this species throughout the landscape, and a lowered risk of displacement by catastrophic wildfire or epidemic insect/disease mortality of trees. Cumulatively, the action alternative effects on nesting and foraging habitats will not lead to a trend toward Federal listing for the sharp-shinned hawk.

***Great Gray Owl*** - Forest-wide S&G WL-31 (LRMP page 4-54) defines nesting habitat for this species as having a mean canopy cover of 60 percent (range of 50 to 70 percent); an overstory tree density of 67 trees per acre with a dbh of 12 inches or greater, have a lodgepole dominated overstory, and have an average distance of 440 feet (range 63 to 1,070 feet) to the nearest meadow.

Habitat estimates for this species within the planning area are the same as for the northern goshawk and were made using the same information and methodologies. There are approximately 1,922 acres of stage 5 lodgepole pine LOS and approximately 3,384 acres of stage 6 lodgepole pine LOS in the planning area. The LRMP requires habitat for eight (8) pairs across the Forest. With no direction in the LRMP for distribution of those pairs, equal distribution across the three ranger districts would require habitat for 2 to 3 pairs on the Bend-Fort Rock Ranger District. Based on land area, the Bend-Fort Rock Ranger District would require habitat for five (5) pairs.

Surveys of the habitat of this species have found a total of six (6) pairs on the Forest at the present time. Five (5) pairs have been identified in the northern portion of the Forest (Sisters Ranger District) and one (1) in the southern portion (Crescent Ranger District). In addition, owls have been heard or seen along the Deschutes River and wet meadows in the central portion of the Forest (Bend-Fort Rock Ranger District). This information suggests that there appears to be suitable habitat on the Forest, but outside of the Opine planning area to support eight (8) nesting pairs. This is consistent with the 42 recorded sightings on the Forest. No sightings have been recorded east of La Pine, Oregon.

There are no canopy coverage estimates for lodgepole in the planning area. There are no natural meadows or riparian habitats favorable for this species within the planning area boundaries. Field surveys detected no members of this species.

Alternative 1 would have no short-term effect on either the habitat or population of this species. Stands currently rated at high risk to bark beetle attack or wildfire would remain at high risk. Long-term, the risk of loss of existing habitat to either bark beetle attack and/or wildfire would remain. Loss of nesting habitat could displace this species from the area. In the event of a catastrophic wildfire, it would take decades for nesting habitat to return.

Maintaining existing and potential habitat with high tree density increases the risk of losing that habitat. Potential nesting habitat is limited in the planning area (comparing acres of potential habitat to total acres) and is likely limited on the landscape. The effect of losing existing and potential habitat in the planning area would be a reduction in population of this species over the affected landscape. It is likely that potential habitats in the adjacent planning areas are already part of an occupied territory; any displaced birds would have to travel long distances to establish new territories.

Populations would remain stable only in the absence of natural disturbances such as beetle outbreak and wildfire. It is more likely that there would be a declining trend in populations as a result of habitat loss due to natural disturbances.

Neither Alternative 2 nor 3 would have any direct or indirect effect on this species. There is no nesting or foraging habitat located in the planning area.

With the exception of vegetation and fuel reduction treatments proposed or implemented in adjacent planning areas, none of the current, on-going, or reasonable and foreseeable actions would have any cumulative or cumulatively significant effects on this species or its habitat. None of these actions would damage or remove habitat.

The cumulative effects vegetation and fuel reduction treatments on this species and its habitat are the same as described for the northern goshawk.

No cumulatively significant effects have been identified for this species or its habitat under any of the three alternatives.

There is a relatively low probability that great gray owls inhabit the Opine project area or those adjacent areas. This is due to the lack of high quality foraging habitats, e.g. natural meadows. These owls may utilize created openings (e.g. clear cuts) that have high gopher populations, however there are very few of these areas within the area. Older lodgepole pine habitat types with large broken topped snags for potential nest sites are also lacking within the project area and adjacent lands.

For the great gray owl, the cumulative effect of the proposed treatments, past treatments, and foreseeable treatments within and adjacent to the planning area, is a short-term, downward trend in the overall amount of dense high risk stands potentially used for nesting, but an upward trend in the amount of open stand conditions more suitable as foraging habitat. Any known nest sites within the planning area of each of these raptor species are protected from disturbance (see PDCs) with nest core areas designated and deferred from treatment; this would also be the case in the adjacent planning areas.

Through time, additional nesting habitat will develop and be of higher quality because of increased diameter growth of trees due to thinning. In particular, the recruitment of large diameter, broken topped snags would enhance potential nesting. The result should be a more stable population of this species throughout the landscape, and a lowered risk of displacement by catastrophic wildfire or epidemic insect/disease mortality of trees. Cumulatively, the action alternative effects on nesting and foraging habitats will not lead to a trend toward Federal listing for the great gray owl.

***Red-tailed Hawk*** **–** This species is a generalist with a wide tolerance for habitat variation. It generally prefers open woodland areas with forest edges and large trees for nesting. The planning area does provide habitat, especially near the forested fringe or forested edges.

The LRMP lists no habitat or population requirements for this species.

No direct or indirect effects were identified under Alternative 1 for this species. Due the generalist nature of this species, habitat and populations are expected to remain stable in both the short and long-term.

Neither action alternative would have any direct or indirect effects on nesting habitat for this species. No trees 21 inches dbh or greater would be removed which would retain nesting habitat. Should an active

nest site be identified during project implementation, mitigation measures proposed for both alternatives, including activity restrictions, would minimize disruptions during nesting season.

Prey habitat would improve under both alternatives. Small and medium tree thinning would create more open stand conditions which allow for greater maneuverability as well as greater visibility and access to prey species. Mechanical shrub treatments and the application of prescribe fire would promote greater plant diversity thereby providing habitat for a wider variety of small mammals, the primary prey of this species.

No measurable cumulative or cumulatively significant effects were identified for this species or its habitat under any of the alternatives for any of the current, on-going, or reasonably foreseeable actions.

Due to the generalist nature of this species, no cumulative effects are anticipated. There will be negligible change in available nesting and foraging habitat that would be difficult to measure and would not be useful or relevant to making an informed decision between the action alternatives. Both action alternatives would promote larger diameter trees for example, which could potentially become nesting sites for red-tails.

The No Action Alternative would not reduce tree density so individual tree sizes would remain smaller, which could be adverse to the recruitment of red-tail nest sites. The action alternatives also promote more open, lower tree density areas which are preferred for foraging by red-tails. Past management activities and wildfires that have created more open forest conditions have also improved habitat for this species. Cumulatively, the action alternative effects on nesting and foraging habitats will not lead to a trend toward Federal listing for the red-tailed hawk.

***Golden Eagle*** **–** Surveys have confirmed a single known active golden eagle nest in the planning area. Additionally, there are a number of historic nest sites. Habitat for this species occurs in grass-shrub, shrub-sapling, and young woodland growth stages of forested areas or in forests with open lands nearby for hunting. The planning area contains favorable foraging habitat in the “desert fringe” habitats of shrublands, sagebrush, and juniper-steppe. It needs a favorable nest site, usually a large tree or cliff, a dependable food supply, primarily of medium to large mammals and birds, and broad expanses of open country for foraging. It favors hilly or mountain country where take off and soaring are facilitated by updrafts; deeply cut canyons rising to open sparsely treed mountain slopes and crags represent ideal habitat.

In the short-term (10 to 15 years), there would be no measurable effect on golden eagle habitat or habitat components under Alternative 1. Long-term (more than 15 years), continued tree encroachment and increasing stand densities would reduce the quality, quantity, and distribution of existing habitat, particularly foraging habitat and habitats favored by prey species. The increasing risk of bark beetle attack and/or wildfire associated with increased stand densities and fuel loadings would place existing nest sites at risk of loss.

Table 3-46 summarizes the proposed treatments and their expected effects for both action alternatives. Due to overlapping vegetation and fuel reduction treatments, treated acres will not equal gross acres.

**Table -3-46 Vegetation and Fuel Reduction Treatment Effects on Known Golden Eagle Nest Sites**

| | Nest Site ID | Gross Acres | Units | Prescriptions | Treated Acres | Effects |
|---|---|---|---|---|---|---|
| Alt. 2 | Golden eagle site | 125 | H03<br>H04<br>P02<br>P03<br>F01 | MTT<br>MTT<br>STT<br>STT<br>Pretreat/Burn | 9<br>44<br>13<br>42<br>125 | Fuels treatments overlap veg units. Prescriptions will not adversely affect golden eagle habitat. 100% treated. |
| Alt. 3 | Golden eagle site | 125 | C303<br>P302<br>P303<br>P304<br>P305<br>F01 | MTT<br>STT<br>STT<br>STT<br>STT<br>Pre-treat/Burn | 34<br>14<br>32<br>38<br>1<br>125 | Fuels treatments overlap veg units. Prescriptions will not adversely affect golden eagle habitat. 100% treated. |

Neither alternative would remove any potential nest habitat of existing trees 21 inches dbh and larger. Thinning proposed under both alternatives would also help to provide additional habitat for potential prey species thereby also increasing, at least until canopies closed, foraging habitat in forested areas.

No treatments are proposed in foraging habitat for this species under either of the action alternatives. Some large fuel treatment units could be utilized by foraging eagles under both alternatives. Application of proposed mitigation measures would be expected to result in no measurable difference in the overall prey base under either of the two alternatives. The amount and distribution of prey species may change based on changes in habitat conditions for those species but prey would remain available.

No measurable cumulative or cumulatively significant effects were identified for this species or its habitat under any of the alternatives for any of the current, on-going, or reasonably foreseeable actions. Large open areas proposed for fuel treatments in any of the planning areas could see a change in the small mammal community that provides the prey base for this species. As treatment units are likely to be part of a larger foraging area or territory, this is unlikely to affect the overall prey base.

Due to the generalist nature of this species, no cumulative effects are anticipated. Golden eagles have a strong preference for very open habitats that are dominated by shrublands. The Opine project will have minimal effects on these types of areas. There will be negligible change in available nesting and foraging habitat that would be difficult to measure and would not be useful or relevant to making an informed decision between the action alternatives.

Both action alternatives would promote larger diameter trees for example, which could potentially become nesting sites for golden eagles. The No Action Alternative would not reduce tree density, so individual tree sizes would remain smaller, which could be adverse to the recruitment of red-tail nest sites. The action alternatives also promote more open, lower tree density areas which are preferred for foraging by red-tails. Past management activities and wildfires that have created more open forest conditions have also improved habitat for this species. Cumulatively, the action alternative effects on nesting and foraging habitats will not lead to a trend toward federal listing for the golden eagle.

***Woodpeckers and Other Cavity-Nesting Species –*** The planning area contains suitable habitat for a number of woodpecker species that are listed in the LRMP as management indicator species. These include the black-backed, white-headed, hairy, and Lewis' woodpeckers and the Williamson's sapsucker. Neither the pileated nor the three-toed woodpeckers are suspected or have been found in the planning area. The pileated woodpecker is more likely to be found in more wet, mixed conifer areas. Also the dominant stand types and average tree sizes within existing stands do not provide suitable habitat for this species. The three-toed woodpecker is not likely to be found because elevations within the planning area

are lower than those commonly reported for the species and there is a relatively small amount of lodgepole pine within the planning area. Therefore these non-occurring species will not be discussed further.

Table 3-47summarizes the habitat features of the woodpecker species that have suitable habitat within the planning area.

**Table 3-47 Summary of Habitat Features of MIS Woodpecker Species, Opine Planning Area**

| Species | Habitat | Home range (acres) | Nest stand Canopy closure (%) | Log cover (%) | Average Nest tree size (dbh in inches) | Average forage tree size (dbh in inches) | # of years dead for forage trees |
|---|---|---|---|---|---|---|---|
| Black-backed woodpecker | PP & LPP | 956 | 46 | 6 | 11-14 | 13 | <2 or live |
| White-headed woodpecker | Large diameter PP | 800 (in fragmented landscape) | 24-41 | --- | 25-32 | 17 | Live |
| Hairy woodpecker | PP & LPP | 25 (territory) | 39 | 9 | 16 | 10-15 | <5 |
| Williamson's sapsucker | PP | 10-20 (territory) | 60 | 10 | 27 | 8 | --- |
| Lewis' woodpecker | PP | 15 (territory) | (open) | --- | 26 | --- | --- |

The analysis assumes that by managing for the needs of these species, particularly the hairy and white-headed woodpeckers and Williamson's sapsuckers, the needs of secondary cavity nesters such as flammulated owls, and other cavity nesters such as pygmy nuthatches and common flickers are met. The specific habitat characteristics for woodpecker species found in the planning area are illustrated in Table 3-6. The habitat descriptions shown in this table were used in conjunction with DecAID in order to determine effects to these MIS species. DecAID was used for certain habitat types in order to further illustrate what snag densities would be utilized by some of the MIS species and at what tolerance levels.

**Black-backed Woodpecker -** This species utilizes mature ponderosa pine and lodgepole pine habitat types at relatively low elevations (less than 4,500 feet), but can be found at higher elevations. As cited by Altman, that designates black-backed woodpeckers as a focal species for old-growth lodgepole pine. There are approximately 5,306 acres of stages 5 and 6 (LOS) lodgepole pine habitat within the planning area potentially suitable for this species.

This species will use smaller snags for nesting as well as foraging. The planning area and adjacent areas have snags of this size class that can serve as potential habitat. In a 1998 study cited by Saab and Dudley found black-backed woodpeckers selecting for clumps of snags and un-logged control plots in their study on fire and salvage logging. The research synthesis for this species in DecAID supports this selection for high density clumps of snags, showing that 29 snags per acre greater than 10 inches dbh would support this species at the 80 percent tolerance level. Although habitat for this species is present, the degree of "clumping" of the existing snags is unknown. The current levels of snags in the project area with lodgepole are significantly below the 80 percent level (.87 lpp snags/ac. average of all diameters 10" or greater).

Recent past, current, and future vegetation and fuel reduction activities in adjacent planning areas, specifically Aspen, Fuzzy, South Bend HFRA, Sunriver HFRA, and Lava Cast, are expected to result in

fewer large, widespread bark beetle epidemics and uncharacteristic wildfires, but continuing to occur in smaller patches. As a result, nesting and foraging habitat is also likely to be distributed across the landscape in smaller patches and lower densities. Reducing the risk of uncharacteristic wildfire and bark beetle epidemics also means that habitat may become more limited. Across the landscape, populations would be expected to decrease in the short-term due to the effects of management on both existing and potential habitat. Long-term, better management of snag densities may result in the population stabilizing across the landscape.

The effects described above would be expected for the two action alternatives, Alternative 2 and Alternative 3. Alternative 1 would implement no management actions to reduce the risk of wildfire or insect attack. Within the larger landscape, the Opine planning area would remain at high risk for insect or wildfire events that would result in relatively large areas creating short-term flushes of habitat and resulting in long-term deficits as snags fall and are only slowly replaced. Nesting and foraging habitat would be in larger patches across the landscape. There would likely be no short-term decline in population, but population fluctuations may be greater due to the lower stability and resiliency to disturbance of stands in the planning area. This is not likely to result in significant effects on population levels on the larger landscape.

There would be no measurable short-term effects on populations of this species under Alternative 1. As noted in the discussion in the lodgepole pine habitat discussion in the previous section on ecological indicator species/habitats and focal species, habitat, particularly stand density and crown cover, would be expected to increase, assuming no large scale disturbances. Long-term, and again assuming no large scale disturbances such as wildfire or insect epidemic, habitat would be expected to increase. This would be true for both lodgepole and ponderosa pine habitats in which this species lives.

In the event of a bark beetle epidemic and/or wildfire event, there would be a short-term flush of habitat associated with the beetle or fire induced mortality. Long-term, foraging habitat, especially in lodgepole pine, would likely recover more quickly than nesting habitat given the size requirements for snags.

Neither Alternative 2 nor Alternative 3 would result in short-term (less than 15 years) effects on the population of this species. Habitat levels would be expected to remain at current levels. Neither alternative removes trees greater than 21 inches dbh. Neither alternative removes snags other than those required to address safety concerns.

By also reducing tree density, protecting the existing snags, and providing for some larger green trees (green tree retention within units), treatment units in both pine habitat types under both action alternatives may achieve mature conditions more quickly than no action. These would be expected to become the mature tree and snag habitat in the future that is associated with black-backed woodpecker habitat.

With the exception of vegetation and fuel reduction activities in adjacent areas, none of the current, on-going, or reasonably foreseeable actions would have any cumulative or cumulatively significant effects for this species under any of the three alternatives.

This species is closely associated with older lodgepole pine forest habitats, which is very limited in the Opine project (~3800 acres). The Paulina fire burned primarily in lodgepole pine about 4 miles west of the project, but the area has not recovered yet. A substantial amount of lodgepole with limited past timber harvest is found in the Potholes areas adjacent to the southwest portion of the project.

Past, current, and foreseeable future actions often have the objective to reduce beetle and wildfire risk (e.g. Lava Cast: 10000 acres with approximately 2000 acres in stands with a lodgepole pine component; and Fuzzy: 16000 acres of mostly ponderosa pine treated to improve health of stand, stand). There are

also planned treatments in the Aspen planning area, but are not removing commercial sized trees. Large, widespread outbreaks and wildfires are expected to become less common but still occur in smaller patches. Post-fire habitats are the most valuable for black-backs. Foraging and nesting habitat in the future will likely be distributed in smaller densities across the landscape.

Cumulative effects to this species and its habitat as a result of the alternatives would be negligible and not relevant to making an informed decision between alternatives due the similarity of habitat throughout the landscape and the common history of past logging. Because the vegetation management objectives seek to reduce the risk of insect outbreaks and wildfire, habitat for this species may become more limited. Over the landscape, populations are expected to initially decrease due to the effects of management, but may in the long-term stabilize through better management of snag densities. Cumulatively, the action alternative effects on nesting and foraging habitats will not lead to a trend toward Federal listing for the black-backed woodpecker.

**White-headed Woodpecker –** This species utilizes both live and dead ponderosa pines. It will forage on both live and dead trees, often selecting the large diameter specimens because they have more seeds and make more suitable nesting habitat. Having large ponderosa pine does not assure this species' presence. Citing a 1997 paper by Marshall, notes that indications have been made that a well-developed understory of trees and shrubs may encourage mammalian predation on nests. White-headed woodpeckers are absent from early seral ponderosa pine stands. These woodpeckers are poor excavators and generally select for a more moderately decayed or softer snag in which to nest. This Habitat for this species can also be an indicator of goshawk, flammulated owl, and pygmy nuthatch habitat.

The lack of large trees and snags throughout the planning area limits the amount and distribution of habitat for this species. Existing habitat within the planning area would be within ponderosa pine LOS but even in this habitat, there is a lack of the large diameter snags in densities recommended by past research. Current snag densities across the planning area are less than 1.9 snags per acre or below the 30 percent tolerance level for this species.

Alternative 1 would likely have no short-term direct or indirect effects on existing habitat of this species. Long-term, additional recruitment of smaller (less than 21 inches dbh) ponderosa pine snags may be realized from bark beetle outbreaks and/or wildfire events, particularly in high risk areas. However, the quality of this habitat would be variable. Nesting habitat quality would be lower as the average diameter of nest snags ranges from 25 to 32 inches dbh. The quality of foraging habitat could be more closely in line with habitat preferences as the average size of foraging snags is 17 inches dbh. The development of new, large ponderosa pine may be compromised by the retention of dense stands and subsequent slow diameter growth. Retaining high densities may also eliminate potential future large diameter trees through losses associated with bark beetle attacks and wildfire events or a combination of both.

Alternatives 2 and 3 would not remove any existing nesting habitat. Neither alternative would remove any trees 21 inches dbh or larger. Neither would remove any existing snags of any size except for reasons of safety. Long-term, thinning would promote the development of single story LOS which is the habitat of this species. Treated stands would provide higher quality habitat in a shorter time period than untreated stands due to increased growth rates on residual trees. More high quality habitat would be created under Alternative 3 than Alternative 2 because more acres would be thinned

Nesting habitat in proposed treatment units may be affected under both alternatives in the short-term. No snags would be removed so existing foraging sites would be retained. Thinning would reduce the potential supply of future snags by reducing stand densities and the risk of both wildfire and bark beetle attack that would potentially produce additional snag numbers. Thinning would also reduce stand canopy closures to either the lower end or below the range for this species. Post-treatment canopy closures are

expected to average approximately 20 percent with a range from 12 to 32 percent. Long-term, more acres of nesting habitat may develop and be retained, especially at the lower levels of the range of canopy closure. It is reasonable to expect that future management actions would target stands that are at moderate to high risk for bark beetle attack for treatment. Subsequent treatments would be expected to result in canopy closure levels similar to those projected for this entry. Post-treatment growth of residual trees would be expected to increase canopy closure levels to at least the lower range for nesting habitat. There are no extensive tracts of land with large diameter ponderosa pine present across the landscape, including both federal and non-federal lands. Past management actions, targeting stands to reduce bark beetle and wildfire risk and/or promoting ponderosa pine and large tree habitat are expected to result in an approximate 26 percent increase in habitat for this species over time across the landscape. Increasing habitat for this species is expected to result in increases in habitat for secondary cavity nesters.

Habitat levels are also expected to increase across the landscape due to the retention of existing snags, especially those 21 inches dbh and larger, management of increased snag densities, and the accelerated development of LOS ponderosa pine habitat. As a result, it is likely that populations of this species would also be expected to increase.

Alternatives 2 and 3, in combination with past, on-going, and proposed treatment actions in other planning areas, would result in the greatest potential distribution of both habitat and increased populations. Alternative 1, which implements no treatments to improve or increase habitat levels, would still provide future habitat but at greater risk of loss to wildfire and/or bark beetle epidemic and require longer periods of time to do so. It is also the most likely to result in both a spatial and temporal gap in habitat due to losses associated with wildfire and/or bark beetle events.

There is no large, continuous tract of un-harvested white-headed woodpecker habitat on the landscape. Because of past harvest both on and off federal land, extensive tracts of land with large diameter ponderosa pines are limited. Past, ongoing, and future vegetation management actions on federal land tend to focus on reducing beetle and wildfire risk and/or promoting ponderosa pine and large tree habitat (e.g. Lava Cast: approximately 7856 acres and Fuzzy: approximately 16,000 acres). White-headed woodpecker habitat is expected to increase over the landscape in time (an approximate 26 percent increase due to vegetation management objectives in Opine, Fuzzy, and Lava Cast projects).

Because each of the alternatives either does not remove snags or trees >21" (i.e. potential white-headed woodpecker habitat), no cumulative effects to white-headed woodpecker populations are expected. In the long-term, due to shifting emphasis in vegetation management to accelerate the development of LOS ponderosa pine habitat and management of higher snag densities, habitat for the white-headed woodpecker is expected to increase (i.e. particularly SS7 single-story LOS). As habitat develops for this species, so does habitat for nuthatches, owls, and other secondary cavity nesters. The Opine project will treat approximately 2059 acres (35 percent of SS6 and 33 percent of SS7) of ponderosa pine habitat in stages 6 and 7 by Alternative 2 and approximately 2560 acres (44 percent of SS6 and 37 percent of SS7) by Alternative 3. The treatments will reduce the risks to these habitats for epidemic insect/disease impacts and/or catastrophic wildfire, while promoting larger trees.

Likely trends are that populations of white-headed woodpeckers would increase. Under the action alternatives, large snag habitat would develop the soonest over the next few decades with populations likely increasing. Cumulatively, the action alternative effects on nesting and foraging habitats will not lead to a trend toward federal listing for the white-headed woodpecker.

**Hairy Woodpecker –** Bull et al's 1986 reported hairy woodpeckers use both lodgepole and ponderosa pine habitats and a variety of snags sizes. This species would be in mature stands and utilize snags greater than 10 inches dbh for nesting and foraging.

Based on the dead wood analysis, there is habitat for this species across the planning area and landscape. There are no identified short-term direct or indirect effects on this species or its habitat under Alternative 1. Uncharacteristic wildfire events and bark beetle epidemics are likely to reduce or eliminate habitat for this species in both the short and long-term. Long-term, the retention of dense stands with the resulting slow diameter growth may delay the development of larger snags that provide nesting habitat for this species.

No trees 21 inches dbh or greater or any existing snags (except those for safety reasons) would be removed under either Alternative 2 or 3. Alternative 2 proposes to treat approximately 2,059 acres of ponderosa pine habitat including 35 percent of the acres in structural stage 6 and 33 percent in structural stage 7. The number of acres increases to approximately 2,560 acres with 44 percent of structural stage 6 and 37 percent of structural stage 7. In lodgepole pine habitat, Alternative 2 would treat approximately 709 acres or 13 percent of the acreage in structural stages 4-7; alternative 3 would treat approximately 804 acres or 15 percent of structural stages 4-7.
With the exception of vegetation and fuel reduction treatments proposed or implemented in adjacent planning areas, none of the current, on-going, or reasonable and foreseeable actions would have any cumulative or cumulatively significant effects on this species or its habitat. None of these actions would remove habitat.

Management actions would not remove existing habitat, i.e. snags. Current and future treatments would utilize thinning from below and would be expected to result in the development of larger diameter trees (and ultimately snags) faster than no treatment alternatives. As a result, habitat would be developed and be more widespread across the landscape. Populations would be expected to remain stable.

Alternative 1 would also result in the development of additional habitat although at a slower rate than the action alternatives assuming there is no large scale bark beetle epidemic and/or uncharacteristic wildfire event. It would create a gap in the landscape with different qualities, quantities, and distributions of habitat than would likely result in treated areas. The risk of loss of existing and potential habitat would remain high; uncharacteristic fire and/or bark beetle epidemics could result in a short-term flush and a long-term deficit in habitat.

In the short-term, both alternatives would remove potential nest trees (16 to 21 inches dbh). Both alternatives would also reduce canopy closure levels below the average (39 percent) for this species. As noted in the previous discussion for the black-backed and white-headed woodpeckers, it is unlikely that future management activities would maintain the high canopy closure levels indicated for this species given the risk of bark beetle attack and subsequent loss of that component of the habitat. It is also unlikely that most of the sites in the planning area are not capable of sustaining those levels without accepting the high risk of bark beetle attack and/or uncharacteristic wildfire events.

Long-term, both alternatives are more likely to result in developing better habitat more quickly than Alternative 1 due to the residual trees responding to the thinning. Both would also produce more and larger diameter trees more quickly.

Hairy woodpeckers utilize both lodgepole pine and ponderosa pine habitats in a variety of seral stages. Moderate sized snags are required for nesting. There are significant amounts of hairy woodpecker habitat in the project area and adjacent lands presently. Snags are variable with localized concentrations. Because neither the alternatives nor any ongoing or reasonably foreseeable project proposes to cut snags, cumulative effects (i.e. additive removal of snags) will be rare, incidental, and not useful or relevant to making an informed decision between the alternatives. The Opine project will treat approximately 2059 (35 percent of SS6 and 33 percent of SS7) acres of ponderosa pine habitat in stages 6 and 7 by Alternative

2 and approximately 2560 acres (44 percent of SS6 and 37 percent of SS7) by Alternative 3. The project will also affect approximately 13 percent (709 ac.) of the lodgepole pine (stages 4-7) with Alternative 2 and approximately 15 percent (804 ac.) with Alternative 3. All treatments are thinning from below to reduce stress on the overstory, which will improve tree size and subsequently snag size in the long-term.

As discussed for the white-headed woodpecker, in the long-term, habitat over the landscape would develop and become more widespread than currently exists. Cumulatively, the action alternative effects on nesting and foraging habitats will not lead to a trend toward Federal listing for the hairy woodpecker.

**Williamson's Sapsucker –** This species often utilizes ponderosa pine habitat but, unlike the white-headed woodpecker, will also utilize mixed conifer habitats. The planning area only contains ponderosa pine habitat and the incidence of this species would be extremely rare. Citing Bull et.al., notes that this species utilizes both dead and live trees for foraging but selects large snags, with diameters greater than 20 inches, for nesting.

Habitat quality and location for this species is similar to that of the white-headed woodpecker. Information developed through DecAID analysis indicates that this species utilizes habitats that contain a greater density of snags, densities of which are currently lacking in the planning area. Habitat is currently being provided at less than the 30 percent confidence level and is also limited by the lack of large diameter snags.

Alternative 1 would likely have no short-term direct or indirect effects on this species or existing habitat. Long-term, additional recruitment of smaller (less than 21 inches dbh) ponderosa pine snags may be realized from bark beetle outbreaks and/or wildfire events, particularly in high risk areas. The development of new, large ponderosa pine may be compromised by the retention of dense stands and subsequent slow diameter growth. Retaining high densities may also eliminate potential future large diameter trees through losses associated with bark beetle attacks and wildfire events.

Alternatives 2 and 3 would not remove any trees 21 inches or larger nor would they remove any existing snags except those presenting a safety hazard. As a result, there would be no measurable change in those components of nesting and foraging habitat for this species in the short-term.

Both alternatives propose thinning to reduce stand densities and reduce the risk of bark beetle attack and uncharacteristic wildfire. Over the long-term, thinning would increase growth rates thereby increasing tree diameters and producing both larger trees and future snags at a faster rate than would be accomplished under Alternative 1. Thinning also reduces levels of canopy closure, particularly in the short-term. Nesting habitat has an average canopy closure of 60 percent, a level far in excess of current levels across most of the planning area. As noted in previous discussions of other woodpecker and cavity nesting species, thinning is expected to reduce canopy closure levels to an average of approximately 20 percent with a range of 12 to 32 percent. As a result, stands with optimum nesting habitat would remain limited, but be more common on the northern aspects of buttes or in more moist areas. Retention patches coupled with untreated stands would help to maintain foraging habitat in both the short and long-term.

With the exception of vegetation and fuel reduction treatments, none of the current, on-going, or reasonable and foreseeable actions would have any cumulative or significantly cumulative effects under any of the three alternatives. Cumulative effects associated with past, present, or future vegetation and fuel reduction treatments in adjacent planning areas would also result in no cumulative effects except for the following.

Some short-term loss of habitat would be expected from activities that reduce canopy closure and stand densities. Recent past, current, and future management activities have the objectives of reducing wildfire and bark beetle risk, while also promoting the development of single-story ponderosa pine and large diameter trees. This would help to create stands that are more resilient to both wildfire and insect attack as well as create additional habitat that is more likely to be stable and less subject to large scale disturbance. Population trends would be expected to follow a similar pattern with potential short-term reductions following vegetation and/or fuel reduction treatments but increasing and stabilizing as new habitat develops and the risk of loss or damage to wildfire and/or insects is reduced. There is no added effect from either of the action alternatives because this species is not known to occupy this planning area. As noted above any incidence of this species in the planning area would be considered uncommon. The cumulative effects of Alternative 1 would be similar to those described for the white-headed and hairy woodpeckers.

There are no cumulatively significant effects identified for this species or its habitat under any of the three alternatives because there are no large, continuous tract of un-harvested Williamson's sapsucker habitat on the landscape. Because of past harvest both on and off federal land, large tracts of forest with large diameter trees are limited. Past, ongoing, and future vegetation management actions on federal land have similar objectives in reducing wildfire and beetle-risk while also promoting single-story ponderosa pine and large tree habitat. Ongoing and foreseeable actions on federal land may reduce canopy closures, but will also accelerate the development of large snags. The Opine project will treat approximately 2059 acres (35 percent of SS6 and 33 percent of SS7) of ponderosa pine habitat in stages 6 and 7 by Alternative 2 and approximately 2560 acres (44 percent of SS6 and 37 percent of SS7) by Alternative 3.

Some habitat over the landscape (adjacent planning areas) will be reduced in the short-term due to commercial harvesting, but as large trees and snags are retained (due to the Eastside Screens), new large structure develops, and stands become more resilient to fires and outbreaks, potential sapsucker habitat will develop and then remain stable. Because of the similarity across the planning areas (Fuzzy, Opine, and Lava Cast) both physically and through ongoing vegetation management objectives (i.e. retaining large trees, improving stand health, and promoting diameter growth), and that there are no direct effects to sapsucker habitat, effects from the action alternatives will be additive to that of the adjacent planning areas. The cumulative effect will be minimal with long-term beneficial effects. There may be an initial decreasing trend in populations as habitat is thinned, and then a stable trend is predicted as large snags develop and risk to habitat is reduced. Cumulatively, the action alternative effects on nesting and foraging habitats will not lead to a trend toward Federal listing for the Williamson's sapsucker]

**Lewis' Woodpecker –** In central Oregon, this species is closely associated with open ponderosa pine forests. This species is often associated with recent fires and targets soft snags for nesting habitat. Proposed thinning and fuel reduction activities are intended to move vegetative conditions closer to historic (pre Euro-American settlement) conditions where low intensity frequent fires played a major role in the types, quantities, and distribution of vegetation across the landscape. Large numbers of snags are less likely to be created across the landscape due to these activities, which would reduce the risk of a catastrophic wildfire event. Habitat and population numbers which would be expected to increase with the increasing size of fires would decline close to historic levels. With the re-introduction of fire into many of these stands in both the short and long-term under both alternatives, the quality, quantity, and distribution of habitat would be expected to be improved. Population numbers would be expected to stabilize, and like habitat, move both temporally and spatially across the landscape.

Alternative 1 would likely have no short-term direct or indirect effects on either the species or existing habitat. Long-term, additional recruitment of smaller (less than 21 inches dbh) ponderosa pine snags may be realized from bark beetle outbreaks and/or wildfire events, particularly in high risk areas. The

development of new, large ponderosa pine may be compromised by the retention of dense stands and subsequent slow diameter growth. Retaining high densities may also eliminate potential future large diameter trees through losses associated with bark beetle attacks and/or wildfire events.

The risk of an uncharacteristic wildfire event would remain high under this alternative. Although this species is closely associated with wildfire induced mortality, existing high fuel loadings coupled with projected increases in those loadings associated with the lack of management to reduce them, are increasingly likely to result in fire intensities that consume increasing quantities of existing snags and live stands that provide existing and potential habitat for this species. There would be a short-term pulse of habitat resulting from the fire lasting only as long as bark is present on the trees, perhaps 8 to 9 years. Subsequently, habitat would be lost. Experience over the past few years has shown that not only are intensities increasing but also the size of the area burned is also increasing. This combination is likely to result in suitable habitat becoming increasingly isolated across the landscape. The lack of periodic low intensity fire would preclude the spatial and temporal development of suitable habitat across the landscape.

Alternatives 2 and 3 would not remove any trees 21 inches or larger nor would they remove any existing snags except those presenting a safety hazard. As a result, there would be no measurable change in those components of nesting and foraging habitat for this species in the short-term.

Both alternatives propose thinning to reduce stand densities and reduce the risk of bark beetle attack and uncharacteristic wildfire. Over the long-term, thinning would increase growth rates thereby increasing tree diameters and producing both larger trees and future snags at a faster rate than would be accomplished under Alternative 1. In contrast to the other woodpecker and cavity nester species previously discussed, this species prefers open forest conditions. In the short-term, thinning would improve habitat conditions with average canopy closure expected to be about 20 percent in ponderosa pine stands. Long-term, because management activities would be expected to continue stocking level control to minimize the risk of bark beetle epidemics and uncharacteristic wildfire events, habitat quality, quantity, and distribution would be expected to move both spatially and temporally across the landscape. With the exception of vegetation and fuel reduction treatments proposed or implemented in adjacent planning areas, none of the current, on-going, or reasonable and foreseeable actions would have any cumulative or cumulatively significant effects on this species or its habitat. None of these actions would remove habitat.

The combination of the lack of frequent, low intensity fires coupled with the low recruitment of large snags has resulted in the significant reduction in habitat for this species across the landscape. Vegetation and fuel reduction activities within the Opine planning area proposed under both action alternatives, in addition to those planned or implemented in adjacent areas, has or would reduce the potential for future large scale wildfires across the landscape. The subsequent, planned re-introduction of low intensity prescribe fire into these stands coupled with the increased tree sizes expected following thinning would increase the amount and distribution of habitat for this species. Increased tree sizes also results in increased snag sizes and additional improvement in habitat quality.

The cumulative effects of implementing Alternative 1 in combination with planned, past, or on-going vegetation and/or fuel reduction treatments in adjacent areas would be similar to those previously described.

No cumulatively significant effects have been identified for this species or its habitat. Population trends are declining primarily due to the change in wildfire occurrence, Marshall et al., 2003. None of the alternatives would be expected to result in a change in this trend.

The lack of frequent, low intensity wildfire events over a prolonged period together with low recruitment of large snags has significantly reduced the available habitat for this species over a large area. Activities proposed by Opine and the other projects in the area would have a significant impact on reducing the probability of future wildfires. However, the planned reintroduction of low intensity, prescribed fire in many stands would mitigate this effect. Further, reduced stand densities in the preferred ponderosa pine habitats would be beneficial together with increased sizes of trees and future snags. The Opine project will treat approximately 2059 acres (35 percent of SS6 and 33 percent of SS7) of ponderosa pine habitat in stages 6 and 7 by Alternative 2 and approximately 2560 acres (44 percent of SS6 and 37 percent of SS7) by Alternative 3. Cumulatively, the action alternative effects on nesting and foraging habitats will not lead to a trend toward Federal listing for the Lewis' woodpecker.

**Mammals**

***Bats***

***Townsend's Big-eared Bat*** **–** The only MIS bat species present on the Deschutes National Forest is the Townsend's big-eared bat. Occurrence is documented on the Forest.

This species depends on caves for hibernation, raising young, and for day and night roosting. There is one cave, Lavacicle, within the planning area. This cave does not have history of supporting many bats of any species. There are extensive areas of lava within the planning area that could provide habitat. Some of the known hibernacula within caves adjacent to the planning area are used by this species. Some small lava formations occur within the planning area and bat usage of these areas due to their size would likely be incidental. A few caves on the Bend-Fort Rock Ranger District harbor large winter hibernating populations of this species, however, none are in the planning area.

This species forages in a broad range of forested conditions ranging from open savanna to fully stocked conifer stands. Prey species are strongly associated with bitterbrush, ceanothus, and other shrub species. Most foraging is suspected to occur within five (5) miles of day roost sites. Past research shows that foraging along forested edges was most common and was apparently due to the availability both of prey species, particularly moths, and protective habitat from predation.

The Central Oregon population, including those inhabiting the Deschutes National Forest, is estimated at 600 individuals (District survey records). Winter hibernacula counts have indicated a decline of approximately 25 percent since 1986. The decline is probably due to a combination of factors including the disturbance of hibernating bats, disturbance of maternity roosts, and the effects of past wildfires on forage resources.

There are no identified direct or indirect effects identified for this species under Alternative 1. Assuming no uncharacteristic wildfires, there would be no measurable effect on foraging habitat. However, wildfire, particularly an uncharacteristic wildfire, would be expected to result in changes to existing shrub densities, distributions, and structural components that could potentially negatively affect the quality, quantity, and distribution of the prey base. This in turn could result in long-term reductions in resident populations due to the lack of a suitable prey base.

Neither of the action alternatives would have measurable effects on this species. Mitigation measures proposed for both alternatives limit effects to caves and rock outcroppings that provide, or could potentially provide roosting habitat for this species.

Foraging habitat could be affected by the prescriptions for fuels treatments in shrub habitat. Alteration of shrub habitat could influence prey availability within the planning area. A variety of shrub structure is desirable in order to attract a variety of insect prey species. The action alternatives create a large amount

of early shrub structure through fuels treatments (mowing and under burning). Alternative 3 creates a larger amount than Alternative 2. Early seral shrubs may not produce as many flowers or leaves, which moths and other insects would feed on in the older seral shrubs. The overall diversity of shrub structure is reduced under both action alternatives. The effect on bat species may be a reduction in available prey or foraging opportunities near roost habitat. Retention patches within proposed units would help off-set this effect, but there would be a dominance of early shrub structure. Under Alternatives 2 and 3 there would be post treatment, respectively, 46 percent and 43 percent in the early seral stage. There is potential habitat in forested lavas within the planning area., but there are known populations of this species. Alternative 3 would not effect any of the potential habitat within the forested lavas.

With the exception of vegetation and fuel reduction treatments proposed or implemented in adjacent planning areas, none of the current, on-going, or reasonable and foreseeable actions would have any cumulative or cumulatively significant effects on this species or its habitat under any of the three alternatives. None of these actions would damage or remove habitat.

No vegetation or fuel reduction treatments are proposed in bat habitat in the Aspen, or Lava Cast planning areas; none were implemented in the Fuzzy planning area. Therefore, there are no identified cumulative or cumulatively significant effects identified for roosting habitat for this species.

Vegetation and fuel reduction treatments could potentially affect foraging habitat by influencing prey availability. A variety of shrub structure is desirable to attract a variety of insect prey species. Prescribe fire and mowing creates large amounts of early shrub structure. Early seral shrubs do not produce the quantity of flowers or leaves that would feed prey insect species. Retention patches would mitigate some of the effect. The changes in habitat for prey species could result in this species altering its foraging patterns or reduce prey species diversity which in turn could result in reduced populations of this species. Mitigation measures included with vegetation and fuel reduction projects as well as other current, on-going, and reasonably foreseeable actions are expected to have no measurable effects on foraging habitat. Therefore, there are no measurable cumulative or cumulatively significant effects on foraging habitat for this species.

***American Pine Marten*** – This species prefers large, somewhat dense, stands of lodgepole pine, mixed conifer, and mountain hemlock containing abundant coarse woody material (CWM) as habitat for rodent prey (S&G WL-61 LRMP page 4-59). Bull et. al. state that mistletoe brooms have been reported as providing habitat for marten.

The planning area contains potential habitat for marten within the late seral lodgepole pine stands in the southern portion of the planning area. There are approximately 5,306 acres of potential habitat in lodgepole LOS stages 5 and 6, but there are no known martens within the planning area.

Alternative 1 has a limited effect on pine marten or its habitat. Approximately 10 percent of the planning area contains LOS lodgepole pine habitat. The planning area contains no mixed conifer or mountain hemlock habitats. This alternative may take the longest in developing large structure/LOS habitat because current growth would continue to slow, relying on and contributing to increased risk of beetle-induced mortality and/or wildfire to reduce the density of the stands. Similarly, it would likely take the longest (70 years or more) to develop better quality habitat (i.e. LOS habitat) due to a decrease in large tree development.

Alternative 1 would have no effect to mistletoe present in some of the stands. This component of potential marten habitat may increase as mistletoe potentially spreads to other stands. Conversely, increasing mistletoe levels also increase the risk of wildlife reducing or eliminating existing or potential future habitat.

The CWM component of marten habitat may increase under this alternative. Retaining dense stands of relatively small diameter trees (8 to 12" dbh), retains the high risk of tree mortality in these stands. This would increase CWM levels and favor marten habitat. The development of large CWM structure used for denning would continue to be slow and levels would remain low.

Due to potential habitat for this species being currently limited within the project area, this alternative would have little effect on potential marten populations. Due to the degree of beetle-mortality risk in the existing stands, marten populations may increase from the influx of coarse woody material.

Retaining the existing condition of potential habitat within the planning area may initially provide more habitat for marten populations. In the long–term however, retaining a high level of risk to these stands may ultimately decrease marten habitat on the landscape as a result of a large wildfire. This also increases the risk of losing existing habitat quickly and thereby resulting in a decreasing trend in marten populations.

Under both action alternatives, the short-term effects would be the decrease in habitat due to the opening of the canopy, the loss of the early recruitment of CWM by improving the health and vigor of the residual trees and reducing the risk of mortality associated with insect attack, and the incidental loss of both downed CWM and snags from fuel reduction activities. The incidental loss of existing CWM and snags would be minimized, but not eliminated by the application of mitigation measures under both alternatives. Long-term, thinning would result in larger structure and more resilient stands that would provide more stable habitat for this species. Vegetation treatments within some lodgepole pine stands under both alternatives that are currently identified as potential habitat have as a specific objective to develop LOS characteristics. Treatments under both alternatives would result in increases in potential habitat leading to a trend of increasing marten populations. However, these are expected to minimal given the already low levels of potential habitat.

Alternative 3 treats more acres of potential habitat than does Alternative 2, 804 acres of lodgepole pine stage 4-7 LOS (15 percent) versus 709 acres (13 percent) of stages 4-7 LOS. Therefore it is expected that Alternative 3 would produce more and higher quality, stable habitat at a faster rate than does Alternative 2. Although Alternative 3 treats more acres, Alternative 2 minimizes the short-term negative effects (fewer acres of habitat remaining after treatment) while also providing long-term benefits.

Both action alternatives are expected to result in a stable to increasing trend in marten populations. There is no measurable difference between these two alternatives given the relatively equal number of acres treated.

Implementation of the action alternatives would contribute more potential habitat on the landscape in the long-term, but a decrease in the amount of potential habitat in the short-term. Treatments would also help to increase the resiliency of the habitat to uncharacteristic wildfire events resulting in more stability in habitat across the landscape. Population trends would likely remain either stable or potentially exhibit an increasing trend.

Implementation of the No Action Alternative in the four planning areas (Lava Cast, Sunriver HFRA, South Bend HFRA, and Long Prairie) would initially retain and potentially provide more habitat for martin populations. However, stands that currently contain habitat or potential habitat are also at high risk for loss from wildfire. Such an event, or series of events, could result in a decrease in the amount and distribution of habitat. Fuel treatments in shrub habitats would have no cumulative effect under any of the alternatives. Shrub habitats do not provide habitat for martin or their prey species.

With the exception of vegetation and fuel reduction treatments proposed or implemented in adjacent planning areas, none of the current, on-going, or reasonable and foreseeable actions would have any cumulative or cumulatively significant effects on this species or its habitat under any of the three alternatives. None of these actions would damage or remove habitat.

There are no known cumulative or cumulatively significant effects on this species or its habitat associated with vegetation and fuel reduction activities completed, being implemented or planned in adjacent planning areas. Neither the Fuzzy planning area to the west nor the Aspen planning area to the south contain known or potential habitat for this species. Therefore, there are no identified cumulative effects on this species associated with past or on-going activities in these areas. The Lava Cast, Sunriver HFRA, South Bend HFRA, and Long Prairie planning areas contain potential habitat and activities have been proposed in those areas. The relative small home range and limited dispersal distance associated with this species greatly limits if not eliminates the possibility of actions in these planning area affecting the population in the Opine planning area. Therefore, activities planned in potential habitat in those planning areas are not considered in the cumulative effects analysis for this species.

Due to elevation and the lack of late seral, moist mixed conifer plant associations, the Opine project area does not contribute much to marten habitat across the landscape. More potentially suitable habitat may be found southwest of the planning area in the Newberry Crater and Paulina Mountains area.

Retaining the existing condition of potential habitat within the Opine project area may initially provide more habitat for marten populations. In the long–term however, retaining a high level of risk to these stands may ultimately decrease marten habitat on the landscape as a result from a large wildfire.

Cumulatively, maintaining potential habitat that has a high risk of beetle-induced mortality and/or wildfire, also increases the risk of losing the habitat quickly. This can potentially contribute towards a decreasing trend in marten populations. Cumulatively, the action alternative effects on denning and foraging habitats will not lead to a trend toward federal listing for the American marten.]

**Snags, Green Tree Replacements (GTRs), and Coarse Woody Material (CWM) Habitat –** Snags are defined as dead trees over eight (8) inches dbh and taller than 10 feet. Coarse woody material (CWM) is defined as dead and downed material that is greater than eight (8) inches diameter at the small end.

Snags and CWM are used by a number of wildlife species for foraging, nesting, denning, roosting, and resting. Primary cavity nesters are the most notable and include woodpeckers and nuthatches that excavate nest cavities in decayed wood in standing trees or snags. When vacated, these cavities are subsequently utilized by secondary cavity nesters including other birds and small mammals. Selected wildlife species known or suspected to occur in the planning area that utilize these habitats include the flammulated owl, white-headed woodpecker, black-backed woodpecker, Williamson's sapsucker, pygmy nuthatch, brown creeper, and the American marten. Table 3-1 at the beginning of this section displays the individual species, their management status, and their known or suspected occurrence within the planning area.

Desired conditions of snag and CWM habitat are based on management recommendations and S&Gs in the LRMP, the Deschutes National Forest Wildlife Tree and Log (WLTL) Implementation Strategy, and the Revised Interim Management Direction (Eastside Screens), which amended the S& G's in the LRMP. The Proposed Decision for the Interior Columbia Basin Final Environmental Impact Statement (ICBEMP) and Draft Environmental Impact Statement (DEIS) for ICBEMP were reviewed for current science as related to these habitats.

The ICBEMP snag and CWM guidelines focused on maintaining snags and CWM greater than 21 inches dbh. They did not address snags or CWM less than 21 inches dbh. They also did not address snags and CWM by size and density by plant association group (PAG). Within the planning area, snags and CWM greater than 21 inches dbh are very limited. The Eastside Screens provide more specific direction for managing for snags and CWM.

The most recent version of the DecAID Advisor was reviewed to determine the recommended desired conditions for snags and down wood cover. Table 3-48 summarizes the results of that review.

**Table 3-48. Snag densities for wildlife species at 30, 50, 80 percent tolerance level for snags > 10"dbh and >20"dbh based on wildlife data in DecAID.**

| | 30% Tolerance level (#snags/acre) | | 50% Tolerance level (#snags/acre) | | 80% Tolerance level (#snags/acre) | |
|---|---|---|---|---|---|---|
| | ≥10"dbh | ≥20"dbh | ≥10"dbh | ≥20"dbh | ≥10"dbh | ≥20"dbh |
| **PPDF** | | | | | | |
| Black-backed woodpecker (BBWO) | 2.5 | 0 | 14 | 1.4 | 29 | 6 |
| Cavity-Nesting Birds (CNB) | 1 | 0 | 5 | 1 | 10 | 3 |
| Long-legged Myotis (LLMY) | 4 | | 17 | - | 37 | |
| Pygmy Nuthatch (PYNU) | 1 | 0 | 6 | 2 | 12 | 4 |
| White-headed woodpecker (WHWO) | 0.3 | 0.5 | 2 | 2 | 4 | 4 |
| Williamson's sapsucker (WISA) | 14 | 3 | 28 | 9 | 50 | 17 |
| *Current Direction for Ponderosa Pine*[1] | ***3*** | ***1*** | | | | |
| *Current Direction for Mixed Conifer* | ***5-9*** | ***4*** | | | | |
| **LP** | | | | | | |
| American marten (AMMA) | 12 | 4 | 13 | 4 | 14 | 4.5 |
| *Current Direction for LP* | **6** | ***N/A*** | | | | |

***Note:*** *Current Direction (Eastside Screens) is provided by habitat type and densities >10" and >20". It is* not broken down into tolerance levels but rather represents a 100% biological potential, *which has been determined to be a flawed technique (Rose et al 2002*).

DecAID does not currently identify snag sizes for lodgepole pine habitat types. Eastside Screens recommend that snag diameters be 12 inches dbh or greater for 100 percent of maximum population potential (MPP). Under the Deschutes National Forest Wildlife Tree and Log Implementation Strategy, 2.58 snags per acres would attain the 100 percent level. In contrast, as cited by Thomas, suggests 1.8 snags per acre with 0.59 snags per acre being greater than 12 inches dbh and 1.21 snags per acres being greater than 10 inches dbh. More recent research, as cited by Rose et. al., suggests that the 100 percent MPP level does not provide adequate habitat for snag dependent species.

Table 3-49 displays species specific information from the DecAID analysis for snag dependent species.

**Table 3-49 Snag densities for selected wildlife species at the 30, 50 and 80 percent tolerance level for snags greater than 10 inches and greater than 20 inches dbh based on wildlife data in DecAID**

| Species | 30% Tolerance level (#snags / acre) | | 50% Tolerance level (#snags / acre) | | 80% Tolerance level (#snags / acre) | |
|---|---|---|---|---|---|---|
| | ≥10"dbh | ≥20"dbh | ≥10"dbh | ≥20"dbh | ≥10"db | ≥20"dbh |
| Black-backed woodpecker (BBWO) | 2.5 | 0 | 14 | 1.4 | 29 | 6 |
| Cavity-Nesting Birds (CNB) | 1 | 0 | 5 | 1 | 10 | 3 |
| Long-legged Myotis (LLMY) | 4 | h | 17 | - | 37 | |
| Pygmy Nuthatch (PYNU) | 1 | 0 | 6 | 2 | 12 | 4 |
| *PONDEROSA PINE / MIXED CONIFER* | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **White-headed woodpecker (WHWO)** | **0.3** | **0.5** | **2** | **2** | **4** | **4** |
| **Williamson's sapsucker (WISA)** | **14** | **3** | **28** | **9** | **50** | **17** |
| ***Current Direction for the Ponderosa Pine[58]*** | ***3*** | ***1*** | | | | |
| ***Current Direction for Mixed Conifer[58]*** | ***5-9*** | ***4*** | | | | |
| | | | | | | |
| **American marten (AMMA)** | **12** | **4** | **13** | **4** | **14** | **4.5** |
| ***Current Direction for LP[58]*** | ***6*** | ***N / A*** | | | | |

Line transect surveys were conducted to determine snag and down log levels in two of the five sub-areas within the planning; the Pine Mountain and Tepee Draw WRHUs. The Pine Mountain WRHU was further subdivided into two (2) parts; the OGMA and other (the area outside the OGMA). The remaining areas were assessed using silvicultural stand exam data. This data was not augmented by data from outside of the planning area boundaries because the minimum size of the assessment area recommended by DecAID (20 square miles) is exceeded by the size of the planning area (approximately 85.3 square miles).

Table 3-50 summarizes the results of the line transect surveys in the Pine Mountain and Tepee Draw WRHUs. Table 3-50 summarizes the results of the analysis using stand exam information.

**Table 3-50 Summary of Snag and Down Log Transects in the Pine Mountain and Tepee Draw WRHUs**

| Sub-Area | Snag Diameter Classes (average number / ac.) | | | Log Decay Classes[59] (average number / ac.) | | | Samples (# of transects / total acres) |
|---|---|---|---|---|---|---|---|
| | 10"-15" | 16"-20" | >20" | 1 | 2 | 3 | |
| **Pine Mt.-OGMA** | **.23** | **.69** | **.92** | **4.00** | **3.15** | **17.7** | **13 trans. / 48 acres** |
| **Pine Mt.-Other** | **.22** | **.33** | **.78** | **6.22** | **10.89** | **18.56** | **9 trans. / 52 acres** |
| **Tepee Draw** | **.50** | **.33** | **.50** | **2.42** | **1.58** | **22.42** | **12 trans. / 59 acres** |
| **Composite Averages** | **1.5 snags / ac. (range 1.33-1.84)** | | | **28.98 logs / ac. (range 24.85-35.67)** | | | |

**Table 3-51 Stand Exam Plot Snag Summary, Lavacicle, Mahogany and Potholes WRHUs**

| Tree Species | Number of Stands / Acres Inventoried | Snags per Acre (average) by Diameter Class | | |
|---|---|---|---|---|
| | | 10"-14.9" | 15"-19.9" | 20 inches and greater |
| **Ponderosa pine** | **20 stands / 1,369 acres** | **.3 snag / ac.** | **.14 snag / ac.** | **.5 snag / ac.** |
| **Lodgepole pine** | **26 stands / 1,481 acres** | **.56 snag / ac.** | **.23 snag / ac.** | **.08 snag / ac.** |
| **Totals:** | **46 stands / 2,850 acres** | **PP total all sizes = .94 snag / ac., LPP total all sizes = .87 snag / ac.** | | |

Both analyses determined that current snag levels are below desired conditions. Data from the transect surveys suggest that the levels of down logs appear to be acceptable in the two WRHUs surveyed. No

[58] Current Direction (Eastside Screens) is provided by habitat type and densities greater than 10 inches and greater than 20 inches. It is not broken down into tolerance levels but rather represents a 100% biological potential. Rose, as cited by the Wildlife Report (page 15), determined this to be a flawed technique.

[59] Log decay classes: 1 = intact, all of bark, with limbs, mostly suspended; 2 = intact to partly soft, all of bark, some limbs, partially suspended; 3 = hard, large pieces, little bark, no limbs, near ground.

down log information was obtainable from the stand exam data because the stand exams did not collect that information. Given that the snag levels recorded by the stand exams were significantly below desired conditions, and since snags eventually become down wood habitat, it is likely and predictable that down wood habitat is also below desired condition, especially in the long-term.

Green tree replacements (GTRs) provide future snags and ultimately future down logs. They were determined to be not a major issue within the planning area. All coniferous stands have fully stocked overstory. This may become a problem at some point in the future in existing black bark ponderosa pine stands with heavy canopy cover because of a general lack of understory regeneration.

**Cumulative Effects –** There are no identified cumulative or cumulatively significant effects associated with any of the current, on-going, or reasonably foreseeable actions in conjunction with any of the three alternatives in this analysis. Current levels of snags are generally below desired levels across the landscape. Recent management activities in Fuzzy and Aspen and planned activities in the Lava Cast planning area have or will implement actions that would over time, increase the number and distribution of snags across the landscape. These actions are also expected to result in larger diameter snags due to increased growth rates associated with both thinning and the use of prescribe fire in forested areas. It is unlikely that funding to implement the creation of additional snags would be available under either of the action alternatives. Therefore, there would be no measurable cumulative effects under any of the three alternatives.

Past, current, and planned actions are also expected to result in increases in the quantity, quality, and distribution of CWM across the landscape for the same reasons. Realization of these objectives would take somewhat longer than that for snags

All management activities, past, current, and planned, incorporate GTR objectives which provide future sources of snag and CWM and are expected, over time to result in levels of both snags and CWM that more closely approximately historic levels across the landscape.

**Special/Unique Habitats –** The planning area has no wet meadows, aquatic / riparian habitats, or talus slopes. There are also no permanent water bodies, including lakes, ponds, rivers or streams with the planning area boundaries.

There is one cave, Lavacicle, in the southern portion of the planning area. It is a large cave with a length of 3,500 feet. Due to past vandalism which has caused considerable damage to the stalagmites in the cave, it is gated to prevent non-designated entry. No data has been found in the District's records on bat occupancy of the cave. The current entrance has also been vandalized making entry by wildlife very difficult.

There are several cliffs and rock outcrops within the planning area that provide potential habitat for golden eagles, prairie falcons, ravens, bobcat, mountain lion, bats, and other species.

There are six man-made guzzlers/trick tanks in the planning area. These provide critical water sources for wildlife. These are augmented during periods of grazing by numerous water sets and water troughs (Sand Springs pasture only).

Forested lavas also occur in the planning area. These areas provide a combination of rock and vegetation for wildlife. The ecotones between these areas and adjacent habitats are also valuable.

Scattered individuals and small patches of mountain mahogany occur in the rocky areas of the planning area. There are no known aspen patches present. There would be no effects on these areas or the wildlife species that utilize them under any of the alternatives.

None of the alternatives would have any director indirect, effects on Lavacicle cave or the six (6) man-made guzzlers/trick tanks. No treatments would be implemented under Alternative 1. Alternatives 2 and 3 do not propose units that include or are adjacent to these areas.

There are several cliffs and rock outcrops that provide potential habitat for golden eagles, prairie falcons, ravens, bobcat, mountain lion, bats, and other species. Forested lavas occur throughout the planning area and provide a combination of rock and vegetation for a variety of wildlife. Rocky areas also contain scattered individual and small patches of mountain mahogany. Alternative 1 would have no measurable direct or indirect, effects on these areas. The use of prescribe fire without application of mitigation measures may effect forest ecotones by burning up vegetation and habitat adjacent to those sites. Mitigation measures such as S/U2 proposed for each alternative would reduce or eliminate the risk of damage or loss of ecotonal habitats.

**Ecological Indicator Species/Habitats and Focal Species (Landbirds) –** Table 3-1 lists the ecological indicator species and those designated as Focal Species found within the planning area boundaries. Most meet both categories. Each potentially represents a community of plants and animals that have specific requirements. Many have overlapping requirements. All of the listed ecological indicator species are endemic to the area and could potentially utilize habitats within it. Some, such as the black-backed woodpecker, would not normally be present, due to the lower elevations of the planning area and lack of extensive lodgepole pine forest. If an insect epidemic or wildfire were to occur within the planning area, this species would likely use this habitat.

Table 3-52 lists selected ecological indicator species found within the planning area that appear to have either habitat limitations or have habitats at risk within the planning area.

**Table 3-52 Selected Indicator Species with Either Habitat Limitations or Have Habitats at Risk**

| Species | Habitat |
|---|---|
| Northern goshawk | multi-stratum LOS forest; |
| Flammulated owl (focal) | large snags, open LOS understories, i.e. single-story, frequent fire |
| Lewis' woodpecker (focal) | large snags, recent un-salvaged burns |
| White-headed woodpecker (focal) | snags, extensive patches of ponderosa pine LOS, large ponderosa and sugar pine trees, multi-stratum stands |
| Pygmy nuthatch (focal) | snags, large ponderosa pine, ponderosa pine LOS |
| White-breasted nuthatch | snags, ponderosa pine LOS |
| Brown creeper (focal) | large, old trees with furrowed bark, snags with bark |
| Olive-side flycatcher (focal) | openings created by burns, large dead-topped conifers |
| Chipping sparrow (focal) | open ponderosa pine understories with regeneration patches |
| Green-tailed towhee | mature shrubs |

| Species | Habitat |
|---|---|
| American marten | concentrations of down logs in mature forest |

***Ponderosa Pine Habitats –*** Alternative 1, No Action, does not address any of the conservation strategies recommended by either of the landbird conservation strategies. No management actions are proposed under this alternative that would reduce the risk of damage or loss of these habitats from uncharacteristic wildfire or bark beetle epidemic. Recovery of habitat, particularly late seral habitat, would take decades.

Both action alternatives address management strategies, specifically thinning and prescribe fire, for these habitat types. Neither alternative would harvest snags except for reasons of safety. Neither would remove trees larger than 21 inches dbh. Alternative 2 would close or decommission approximately 19 miles of existing system roads; Alternative 3, approximately 41 miles. Both alternatives include design criteria and other mitigation measures to prevent the spread or introduction of noxious weeds.

Both action alternatives have the objective of improving forest health. Both would also result in the creation of single-story LOS stands over the long-term. However, Alternative 2 treats fewer acres than Alternative 3 and therefore has less of an affect, specifically canopy reduction, on existing stands with high canopy cover levels than does Alternative 3. Additional discussion on effects in these types of stands can be found in the following MIS section discussion on the northern goshawk.

In the short-term, 10 to15 years, both alternatives would result in changes in habitat for the focal species of this type. Habitat for chipping sparrows would increase due to created openings and the thinning of overstory trees. Long-term, habitat for this species would begin a long, slow decline. Short-term, there would little or no effect on habitat for pygmy nuthatches and white-headed woodpecker. No snags would be lost. Long-term, 10 to 15 years and longer, habitat both species would increase in response to increased tree growth resulting from the thinning and canopies again close. Habitat for the flammulated owl may increase in quality in both the short and long-term with openings being created (short-term) and the development of thickets and larger structure (long-term). This species, although identified as a focal species in mixed conifer but not ponderosa pine, is also associated with ponderosa pine habitats.

This habitat would become more stable as treated stands respond to management activities and the risks of uncharacteristic wildfire and bark beetle attack are reduced. Fuel loadings would be reduced potentially allowing for the return of the historic fire regime. In the long-term, the habitat for all of the associated ponderosa pine focal species would be expected to improve in quality. Both alternatives create more LOS habitat. There is only a marginal difference in acreage treated between alternatives in terms of potential LOS habitat so there is no measurable difference between the alternatives for these species.

**Cumulative Effects - Ponderosa Pine Habitats**

Vegetation and fuel reduction activities proposed or implemented in ponderosa pine stands in adjacent or nearby planning areas that improve the stability and quality of ponderosa pine habitat and aid in developing more late-seral, single-story ponderosa pine habitat would provide better distribution of the focal species associated with this habitat group in conjunction with all three alternatives. Alternative 1, because there would be no treatments in this habitat group, would not improve the stability or quality of these habitats nor would it promote the development of late-seral, single-story ponderosa pine habitat. A limited amount of high quality habitat would remain within the planning area. With the current and projected levels of risk to bark beetle epidemics and/or uncharacteristic wildfire events remaining in these stands, a reduction in habitat for at least some of the focal species could occur over the long-term. As a

result, a gap would exist between treated areas in the Aspen planning area to the south and the Fuzzy planning area to the west. There would be no measurable increase in tree growth and either no increase or potentially a decrease in this type of habitat in the long-term within the planning area. Conversely, Alternatives 2 and 3 would not only result in increased growth on residual trees, increased resiliency to disturbance, and potentially a significant increase in this type of habitat over the long-term within and adjacent to the planning area, both would also provide for more resilient populations of focal species dependant upon this type of habitat in the event of a large wildfire or insect epidemic.

Activities that reduce stand densities, including harvest and burning, would potentially reduce the quantity and distribution of dense stands across the landscape. This potentially would reduce the amount of habitat available for those species dependant on high canopy cover forests such as the northern goshawk. These cumulative impacts would be greatest under Alternatives 2 and 3 due to the acreages proposed for either commercial or non-commercial harvest or burning. These impacts are at least partially mitigated by the restrictions on the types and extent of activities permitted within key habitat areas such as nest sites and foraging areas. Species dependant on these denser stands would have the least cumulative impacts under Alternative 1.

Within the planning area and the adjacent planning areas (e.g. Fuzzy, Aspen), improving the stability and quality of ponderosa pine habitat, and developing more late-seral single-story ponderosa pine habitat will provide better distribution of the focal species. It is estimated that through these management objectives to improve the resiliency of the stands and increase tree growth (i.e. development of LOS) there would be a significant increase in this type of habitat in the long-term within the project area. Increased amounts of quality habitat in the planning area will provide more resilient populations of dependent focal species in the event of a large wildfire or insect outbreak.

Thinning activities will cumulatively reduce canopy cover levels across the project area and in conjunction with past and future thinning in adjacent planning areas have a significant total reduction in dense stands across a large landscape. This could potentially be a negative effect for those species dependent upon high canopy forests (e.g. northern goshawk), however a positive effect for many other species that require a frequent fire habitat type with more open structure.

***Lodgepole Pine Habitats –*** Alternative 1 would retain all lodgepole pine stands in their current condition. The potential loss of these stands as a result of wildfire or bark beetle attack, would, if occurring on a small scale (estimated at 10 to 100 acres within home range of approximately 956 acres), benefit the black-backed woodpecker, the focal species of this habitat. Conversely, such an event, or combination of events, would adversely impact this species. There would be a short-term burst of habitat both nesting and foraging habitat. Foraging habitat would disappear within approximately 2 to 5 years as bark sloughs off. Nesting habitat would last somewhat longer, perhaps up to 10 years or until trees fell over. Assuming no disturbance, habitat, particularly stand density and crown cover, would be expected to increase, at least in the short and near long-term. Longer term, the natural cycle of bark beetle attack, increased mortality, and subsequent wildfire would occur. This combination of events would reduce or eliminate much or the entire existing habitat and require 40 or more years for structurally complex habitat to be restored. Existing conditions coupled with past events and experience suggests that a large scale event or events is more likely to occur than a small scale one and sooner rather than later.

Alternatives 2 and 3 propose to treat approximately 708 and 776 acres respectively of lodgepole pine habitat. Prescriptions in both alternatives would thin overstocked stands to reduce stress to overstory trees and reduce the potential for bark beetle attack. This would reduce the risk of losing large blocks of habitat from insect attack. This also reduces nesting habitat by reducing canopy closure in the short-term. Thinning from below also temporarily reduces structurally diversity which also reduces the quality of nesting habitat. In the long-term, stand development would result in increased canopy closures and

restore structural diversity thereby improving and increasing the quality, quantity and distribution of nesting habitat. Retention patches, 10 percent under Alternative 2 and 20 percent under Alternative 3, in treatment units may provide foraging habitat for the woodpecker as trees in those denser patches succumb to stress, bark beetle attack, or other agents. Additional discussion of the effects of each of the alternatives can be found in the following section on MIS species, which includes the black-backed woodpecker.

Impacts to other species that heavily utilize these habitats such as the three toed woodpecker, are not likely found within the planning area boundaries but tend to found at higher elevations elsewhere on the District and Forest.

**Cumulative Effects - Lodgepole Pine Habitats**
In contrast to ponderosa pine habitats, lodgepole pine habitats are more limited in this and adjacent and nearby planning areas – Lava Cast, Fuzzy, and Aspen. Given the distance between the Opine planning area and the Lava Cast planning areas, this area is not included in the analysis. There are no identified cumulative or cumulatively significant effects identified under any of the three alternatives with vegetation or fuels reduction activities in either the Fuzzy or Aspen areas, both of which targeted treatments in ponderosa pine and only limited treatments in low quality lodgepole pine habitat (Fuzzy only). None of the other activities have identified cumulative effects on this habitat.

Cumulative effects to this habitat type are similar to those described under the ponderosa pine habitat. The large lodgepole pine-dominated stands as referred to in the Conservation Strategy are relatively common only in the southern third of the Opine area. (e.g. Potholes area). Although there are risks to maintaining current habitat conditions, cumulatively potential impacts would be likely be minimal in the short-term.

***Priority Habitats (Shrub-Steppe and Unique) –*** Alternative 1 has limited impact on these habitats. Insect/disease epidemics that affect adjacent ponderosa and lodgepole pine habitats have no measurable impact on these habitats. With the exception of encroaching pines and juniper, none of the species found in these habitats are susceptible to these disturbance agents.

Because no vegetation or fuel reduction treatments would be implemented, continued tree encroachment and increasing canopy cover levels would be expected. No measurable change would be expected in the short-term. Existing vegetation would experience increased competition of scarce resources including nutrients, water, light, and growing space. This would continue the reduction in the quality, quantity, and distribution of shrub, grass, and other herbaceous vegetation in those areas. In turn, this would result in reductions in the populations of species that depend on those plant species for nesting, hiding, foraging, and brood rearing habitat. Historic shrub-steppe, sagebrush, shrubland, and unique habitats would continue the evolution into juniper or pine woodland and ultimately into forest.

Wildfire, and particularly uncharacteristic wildfire, could negatively affect these habitats. Uncharacteristic large fires create conditions that favor the establishment/expansion of other species such as rabbitbrush and noxious weeds or other invasives such as cheatgrass. Establishment of cheatgrass, an invasive species, also results in short fire cycles which preclude establishment and maintenance of tall shrubs such as sagebrush and bitterbrush. Recent fire events suggest that current fuel loadings are more likely to result in uncharacteristic effects and impacts, eliminating or greatly reducing the quantity, quality, and distribution vegetation characteristic of these habitats. An uncharacteristic event is more likely to result in the loss of large contiguous areas of habitat in contrast to historic fire events and fuel loadings which were smaller and more localized in area and impacts. The intensity of current fires is also likely to preclude re-establishment and recovery of existing habitats in periods of less than 40 to 50 years or more.

Encroachment by pine and juniper would continue in many habitats under Alternative 2, particularly habitats important to wildlife species favoring sagebrush and shrub-grass habitats. No removal of encroaching trees to enhance sage-grouse habitat would be implemented under this alternative. These habitats would continue to slowly transition to juniper or pine woodland and ultimately forest. However, 507 acres would have encroaching trees, particularly juniper nine (9) inches dbh and smaller but also ponderosa pine, removed to maintain or improve conditions range conditions including conditions for a variety of shrub, grass, and herbaceous vegetation. These sites would revert from developing juniper woodland to shrub –steppe, shrubland, or sagebrush habitats. Alternative 3 would reduce the level of tree encroachment on approximately 7,186 acres of historic sage-grouse habitat that would help to maintain existing shrub, grass, and herbaceous vegetation in those areas. It would also remove encroaching trees on approximately 235 acres to improve range conditions. Treatments target junipers less than 14 inches dbh and ponderosa pine less than 16 inches dbh for removal. Treatment sites are sagebrush or other historic shrub sites only; juniper woodland sites would not be treated.

Under Alternatives 2 and 3, mitigation measures to protect snags, down logs, green tree replacements, mature shrubs, nesting birds, special/unique habitats, large trees, LOS, dense tree patches, etc. would adequately insure that there are no unacceptable short or long-term negative effects on this large group of species. In addition, the proposed actions would benefit species that are dependent upon large trees/snags, open single-storied old growth forest structure, and herbaceous understory vegetation.

Fuels treatments within shrub or shrub-steppe habitats will reduce understories in the short-term. However, in the mid- to long-term the understories should be more diverse and abundant. Plants dependent upon micro-sites under shrub canopies, however, may be adversely impacted by the combination of grazing and fuel treatments. This would only be a concern in regards to focal species for the greater sage-grouse. Alternative 3 has eliminated the units proposed by Alternative 2 that would have had a negative effect upon sage-grouse habitats.

### Proposed, Endangered, Threatened, and Sensitive (PETS) Wildlife Species –

### Threatened, Endangered, and Sensitive (TES) Species

There are no known Threatened or Endangered species present within the planning area boundaries. There are plant (see Botany) and animal species listed as sensitive on the Region 6 Regional Forester's Sensitive Species List present within the planning area. The effects on these species are analyzed and compared by alternative.

**Proposed, Endangered, Threatened, and Sensitive (PETS) Wildlife Species**

| PETS Species | Effect Determination | Notes |
|---|---|---|
| Greater sage-grouse | No Impact | Determination contingent upon meeting specified PDCs from the programmatic BA |
| American peregrine falcon | No Impact | |
| Pygmy rabbit | No Impact | |

A biological evaluation (Wildlife BE) was completed to assess the impacts of the proposed actions on wildlife species designated as endangered or threatened, proposed for designation as either endangered or threatened, or designated by the Forest Service as a sensitive species. A biological assessment (BA) was not prepared for this project because:

1) it is not a major federal construction project that requires an environmental impact statement;

2) the effects on federal threatened, endangered and proposed species are not significant (i.e. adverse or jeopardy); and
3) it meets the Project Design Criteria (PDC) for the Joint Aquatic and Terrestrial Programmatic Biological Assessment (BA) for Fiscal Years 2003-06 (USDA et al. 2003), hereafter referred to as the Programmatic BA (Wildlife BE page 1).
4) No endangered, threatened or proposed species inhabit the analysis area.

Table 3-53 lists the species considered for this analysis. It also lists the current status of those species. Only the American peregrine falcon, the greater or western sage-grouse, and the pygmy rabbit are known, suspected, or have some potential to occur within the planning area boundaries. The remaining species have no known currently occupied sites, no known historic sites, and/or no current or potential habitats within the planning area boundaries (Wildlife BE page 3).

**Table 3-53 Proposed, Endangered, Threatened, and Sensitive (PETS) Wildlife Species**

| Species – Common Name | Species – Latin Name | Current Status[60] |
|---|---|---|
| Northern bald eagle | *Haliaeetus leucocephalus* | T, OR/T |
| Northern spotted owl | *Strix occidentalis caurina* | T |
| Canada lynx | *Lynx canadensis* | T |
| Spotted frog | *Rana pretiosa* | C, OR/S |
| Crater Lake tightcoil | *Pristiloma arcticum* var. *crateris* | S |
| Harlequin duck | *Histrionicus histrionicus* | S, SOC |
| Horned grebe | *Podiceps auritus* | S |
| Red-necked grebe | *Podiceps grisegena* | S, OR/S |
| Bufflehead | *Bucephala albeola* | S |
| Yellow rail | *Cotumicops noveboracensis* | S |
| Tri-colored blackbird | *Agelaius tricolor* | S |
| Greater or Western sage-grouse[61] | *Centrocercus urophasianus* | S, SOC, OR/S* |
| American peregrine falcon | *Falco peregrinus auntum* | S, OR/E |
| California wolverine | *Gulo gulo luteus* | S, SOC, OR/T |
| Pacific fisher | *Martes pennanti pacifica* | S, SOC, OR/S |
| Pygmy rabbit | *Sylvilagus idahoensis* | S, SOC, OR/S |

The nearest known spotted owl site is at least 28 miles to the west. The nearest bald eagle sites are located approximately six (6) miles to the southwest at East Lake and 18 miles south at Flat Top Butte.

**American peregrine falcon -** The only potential habitat in the planning area is located in the areas of cliffs on the southwest flank of Pine Mountain. These cliffs are likely not high enough or sheer enough for adequate security for peregrines to nest. Generally, this species nests within one (1) mile of water. These are no permanent water bodies (lakes, ponds, rivers, streams, etc.) located within the planning area boundaries. Additionally, there are no potential foraging areas (e.g. riparian zones, marshes) with high numbers of birds in the vicinity of the planning area. There have been no known observations of peregrine falcons within the planning area, but there is the potential for migrating birds to pass through the area (Wildlife BE page 3).

There are no known direct or indirect effects peregrine falcons under any of the alternatives. This determination is based upon the following:

- No known occupancy;
- No impacts on cliff habitats; and
- No suitable foraging habitat within the planning area (Wildlife Be page 4).

[60] E = Endangered. T = Threatened. C = Candidate for Federal listing. P = Proposed for Federal Listing. SOC = USFWS Species of Concern. S = USFS Region 6 Sensitive Species. OR/T,E, or S = State of Oregon Status.
[61] This species has been petitioned for listing but was found not to be warranted by the USFWS in 2003 (Wildlife BE page 3)

**Pygmy rabbit -** This species may occur on the eastern fringes of the project, but it is the collective opinion of Forest Service and Oregon Department of Fish and Wildlife biologists that it is highly unlikely. Pygmy rabbits require relatively tall, dense clumps of sagebrush (i.e. Great Basin or big sage) on deep, friable soils. Studies suggest that a high canopy cover of sage is required (i.e. 21 to 36 percent). The volcanic pumice soils characteristic of the planning area are loose and not conducive to supporting the tunnels built by pygmy rabbits. In addition, the area is dominated by low and mountain sage species that have relatively low height and canopy cover (Wildlife BE page 3).

There are no known direct or indirect effects pygmy rabbits under any of the alternatives. This determination is based upon the following:

- Very low probability of rabbits occupying the planning area; and
- Under the action alternatives, there are no treatments in sagebrush dominated plant associations that would substantially eliminate or degrade sagebrush cover.

Furthermore, fuel reduction treatments proposed in open ponderosa pine stands would not affect pygmy rabbits or their habitat because this species does not inhabit forested areas (Wildlife Be page 5).

There are no known indirect, direct, or cumulative negative impacts on this species by the action alternatives of this project. This determination is based upon: 1) very low probability of any pygmy rabbits occupying the project's area; and 2) no planned treatments of sagebrush dominated plant associations that would substantially eliminate or degrade sagebrush cover. Treatments in small shrub dominated openings in areas to be treated by natural fuels units in open ponderosa pine stands would not be impacting, because pygmy rabbits do not inhabit forested areas.

**Greater or Western sage-grouse -** Sage-grouse are closely associated with big sagebrush habitat types and are commonly referred to as “sagebrush obligates.” During spring and summer months, they may use the fringes of open forest habitat types with good herbaceous understory. In winter, they depend upon low elevation big sagebrush habitats for survival (Wildlife BE page 3).

Sage-grouse are generally not known to winter within the planning area, but one (1) bird has recently been documented on Forest Service lands (Wildlife BE page 3).

There are no known lek sites (i.e. breeding/display grounds) on Forest Service lands, but there is a site near Evans Well on BLM managed lands approximately three (3) miles northwest of the planning area boundary (Wildlife BE page 3).

Sage-grouse have been documented to nest and rear young within the planning area boundary. A BLM radio telemetry study (USDI 1995) verified both nest sites and brood rearing areas in the vicinity of Pine Mountain. Another telemetry study is presently underway by the BLM. Together the two studies have identified the present known area of occupied habitat within the project’s boundary. Additional information regarding these studies can be found in the analysis files at the Bend-Fort Ranger District office (Wildlife BE page 3).

In early 2003, a habitat analysis using plant association groups was conducted to determine the approximate historic habitat areas for the Opine Project Historic habitat was identified within the project's area using plant associations that have a strong sagebrush component. Within the planning area, there are a total of approximately 29,541 acres of historic habitat including approximately 11,713 acres of ponderosa pine-sagebrush habitat and approximately 17,828 acres of xeric shrublands with sagebrush (Wildlife BE page 4).

Table 3-54 summarizes the information by sub-area, and plant association.

**Table 3-54 Acreage of Historic Sage-Grouse Habitat by Sub-Area and Plant Association**

| Sub-Area | Plant Association | | Total |
|---|---|---|---|
| | Ponderosa Pine – Sagebrush (CPS1-11) | Xeric Shrub (SD) | |
| Pine Mountain | 2,237 | 9,119 | 11,356 |
| South of Pine Mountain | 3,505 | 5,132 | 8,637 |
| West of Pine Mountain | 5,971 | 3,577 | 9,548 |
| Totals | 11,713 | 17,828 | 29,541 |

The methodology used to map historic habitat types was agreed upon by biologists for the Forest Service, Bureau of Land Management, Oregon Department of Fish and Wildlife, and US Fish and Wildlife Service. Occupied habitats are only partially known, and the present sites are from radio telemetry data and observations of field biologists (Wildlife BE page 4).

A map delineating historic grouse habitats is located in the analysis file at the Bend-Fort Rock Ranger District.

**Alternative 1:** In the short-term Alternative 1 would retain current quantities, quality, and distribution of habitat for the greater sage-grouse. In the long-term (greater than 10 years) continuing tree encroachment in existing shrub and shrub-grass habitats would result in declines in the quality, distribution and quantity of available habitat due to the loss of shrubs and grasses that provide cover and forage (Wildlife BE page 4). The number and distribution of suitable perches for predator species would slowly increase, potentially increasing the potential and risk of increased predation on both adults and chicks. In forested habitats, continued expansion of overstory tree canopies would also result in reductions in the quality, quantity, and distribution of understory vegetation used by sage-grouse for foraging and brood rearing.

**Alternative 2:** Alternative 2 would maintain or improve approximately 24 percent (2,782 acres) of the historic habitat (11,356 acres) in the Pine Mountain sub-area, primarily brood rearing in mixed forest/shrub areas, through thinning, fuel reduction, or a combination of both. No habitat enhancement would be implemented in nesting habitat. Habitat improvements resulting from such treatments would be relatively limited in duration; lasting only until stand densities and/or tree canopy expansion resulted in the reduction or loss of understory vegetation, perhaps two to three decades at the most (Wildlife BE page 5).

It would also maintain or improve approximately 51 percent (4,870 acres) of the historic habitat (9,548 acres) in the sub-area west of Pine Mountain, primarily brood rearing in mixed forest/shrub areas, through thinning, fuel reduction, or a combination of both. Habitat improvements resulting from such treatments would be relatively limited in duration; lasting only until stand densities and/or tree canopy expansion resulted in the reduction or loss of understory vegetation, perhaps two to three decades at the most (Wildlife BE page 5).

Across the planning area, this alternative would treat approximately 71 percent of the historic habitat in the ponderosa pine-sagebrush plant association group (8,208 acres total) and approximately 14 percent of the xeric shrub plant association (12,696 acres total). No treatments would be implemented in historic habitat in the sub-area south of Pine Mountain.

Table 3-55 summarizes the acres of historic sage-grouse habitat in the Pine Mountain sub-area affected by proposed vegetation and fuel reduction treatments proposed under Alternative 2. None of the treatments proposed under this alternative are affecting known occupied habitats but, in some instances, are adjacent to known use sites.

**Table 3-55 Acres of Historic Sage-Grouse Habitat Affected by Alternative 2 Vegetation and Natural Fuel Treatments**

| Sub-Area | General Treatments | Plant Associations Affected (acres) | | Prescription(s) | Total Acreage |
|---|---|---|---|---|---|
| | | Ponderosa Pine-Sagebrush | Xeric Shrub-Sagebrush | | |
| Pine Mountain | Fuels Only | 1102 | 831 | Variable (broadcast burn, burn under tree driplines, pre-treat understory conifers plus burn, mow, etc.) | 1,933 |
| | Vegetation Only | 7 | 0 | Variable (thin small trees to 16", thin small and medium trees to 21", pre-commercial thins, etc.) | 7 |
| | Fuels/Veg Overlaps | 399 | 443 | Combinations of above categories | 848 |
| | Total | 1,508 | 1,274 | | 2,782 |
| West of Pine Mountain | Fuels Only | 4,075 | 496 | Variable (broadcast burn, burn under tree driplines, pre-treat understory conifers plus burn, mow, etc.) | 4,571 |
| | Vegetation Only | 58 | 0 | Variable (thin small trees to 16", thin small and medium trees to 21", pre-commercial thins, etc.) | 58 |
| | Fuels/Veg Overlaps | 206 | 35 | Combinations of above categories | 241 |
| | Total | 4,339 | 531 | | 4,870 |

.

**Alternative 3:** Alternative 3 treats a smaller percentage, approximately 17 percent (1,953 acres) of the historic habitat in mixed forest/shrub areas. Impacts of treatments in forest areas would be similar to those described for Alternative 2, but on fewer acres.

The combination of fuel and vegetation units in Alternative 3 would treat approximately 50 percent of the historic and/or occupied sage-grouse habitat in the Pine Mountain sub-area.

Table 3-56 summarizes the acres of historic sage-grouse habitat affected by proposed vegetation and fuel reduction treatments proposed under Alternative 3. None of the treatments proposed under this alternative are affecting known occupied habitats but, in some instances, are adjacent to known use sites.

**Table 3-56 Acres of Historic Sage-Grouse Habitat Affected by Alternative 3 Vegetation and Natural Fuel Treatments, Pine Mountain Sub-Area**

| Sub-Area | General Treatments | Plant Associations Affected (acres) | | Prescription(s) | Total Acreage |
|---|---|---|---|---|---|
| | | Ponderosa Pine-Sagebrush | Xeric Shrub-Sagebrush | | |
| Pine Mountain | Fuels Only | 632 | 646 | Variable (broadcast burn, burn under tree driplines, pre-treat understory conifers plus burn, mow, etc.) | 1,278 |
| | Vegetation Only | 58 | 3 | Variable (thin small trees to 16", thin small and medium trees to 21", pre-commercial thins, etc.) | 61 |
| | Fuels/Veg Overlaps | 807 | 42 | Combinations of above categories | 849 |
| | Totals: | 1,497 | 691 | | 2,188 |
| West of Pine Mountain | Fuels Only | 2,938 | 465 | Variable (broadcast burn, burn under tree driplines, pre-treat understory conifers plus burn, mow, etc.) | 3,403 |

| Sub-Area | General Treatments | Plant Associations Affected (acres) | | Prescription(s) | Total Acreage |
|---|---|---|---|---|---|
| | | Ponderosa Pine-Sagebrush | Xeric Shrub-Sagebrush | | |
| | Vegetation Only | 78 | 1 | Variable (thin small trees to 16", thin small and medium trees to 21", pre-commercial thins, etc.) | 79 |
| | Fuels/Veg Overlaps | 28 | 35 | Combinations of above categories | 63 |
| | Totals: | 3,044 | 501 | | 3,545 |

**Action Alternatives:** Habitat for the greater sage-grouse would be maintained or improved under Alternatives 2 and 3. Fuel reduction and vegetation treatments in Alternatives 2 and 3 would alter plant communities toward historic conditions. No treatments under either alternative are proposed in known occupied nesting habitats.

Implementation of proposed fuel and vegetation treatments under both alternatives could result in disturbance or displacement of nesting or brood rearing grouse. Application of mitigation measures identified for both alternatives would eliminate this risk.

The proposed closure of system roads under both alternatives would also serve to protect and maintain existing habitat. Alternatives 2 and 3 current uses would continue. Cross-country motorized travel would continue to potentially disturb or displace nesting and brood rearing birds. Habitat would continue to be at risk of damage or destruction where vehicle travel occurred.

In conclusion, the effects of vegetation treatments for both action alternatives have been determined to provide positive effects for historic sage-grouse habitats, including known occupied habitats. Therefore, there are no direct adverse impacts on sage-grouse habitats. Direct or indirect adverse effects could occur if nesting or brood rearing grouse are disturbed or displaced by treatment activities. Compliance with the PDCs would eliminate any adverse impacts.

The closures of roads/OHV trails within historic sage-grouse habitats by both action alternatives would also be a positive effect. Additional closures would potentially occur via future OHV access planning. Potential cumulative adverse impacts on the vegetative components of habitat were reviewed, and it was concluded that only rangeland livestock grazing was a significant consideration. Refer to the recent Cinder Hill EA for a detailed evaluation of the effects of grazing on greater sage-grouse within the Opine Project's area.

Other potential adverse cumulative effects are primarily related to those on adjacent non-Forest Service lands including: grazing on BLM and private lands (most notable in the areas of occupied leks and low elevation wintering habitats); OHV use and road densities on BLM and private lands; and hunting of sage-grouse on BLM and private lands as administered by ODFW. Given that a petition to list the Greater sage-grouse was denied by the USFW (USDI 2003) it is concluded that these effects are insignificant, as well as beyond the scope of this project.

## Irreversible and Irretrievable Commitments of Resources

***Soils –*** Neither action alternative is expected to create any impacts that would cause irreversible damage to soil productivity. There is low risk for mechanical disturbances to cause soil mass failures (landslides)

due to the inherent stability of dominant landtypes and the lack of seasonally wet soils on steep slopes. Careful planning and the application of BMPs and project design elements would be used to prevent irreversible losses of the soil resource.

The development and use of temporary roads and logging facilities is considered an irretrievable loss of soil productivity until their functions have been served and disturbed sites are returned back to a productive capacity. The both action alternatives include soil restoration activities (subsoiling) that would improve the hydrologic function and productivity on detrimentally disturbed soils. There would be no irretrievable losses of soil productivity associated with reclamation treatments that decommission unneeded roads and management facilities (Soils Report page 43).

**Short-Term Uses of the Human Environment and the Maintenance of Long-Term Productivity**
LRMP standards and guidelines, mangement requirements, and mitigation measures built into the action alternatives ensure that long-term productivity would not be impaired by the application of short-term management practices. Both action alternatives would improve soil productivity in specific areas where soil restoration treatments (subsoiling) are implemented on soils committed to roads and logging facilities.

# CHAPTER 4 - Agencies and Publics Consulted

The following agencies and individuals were consulted as part of the planning process. They provided information, input, knowledge, and expertise that helped develop the issues, action alternatives, and helped to focus the analysis.

- USDI Fish and Wildlife Service (USFWS)
- Oregon Department of Fish and Wildlife (ODFW)
- Mark Dunaway, Observatory Manager, Pine Mountain Observatory, University of Oregon
- Jan Hanf, Wildlife Biologist, Prineville District, Bureau of Land Management (BLM)
- Sarah Schartz, OHV Specialist – BLM (resigned)
- Glen Ardt, Habitat Biologist, Oregon Department of Fish and Wildlife

# CHAPTER 5 - LIST OF PREPARERS

This section identifies the Forest Service personnel who participated in the analysis and the preparation of the EA. For a list of organizations and individuals contacted during the scoping process, refer to the project file located at the Bend-Fort Rock Ranger District.

***Interdisciplinary Team***

| | |
|---|---|
| James Lowrie | Wildlife Biologist – Team Leader |
| Cathy O'Brien | Fire - Fuels Specialist |
| Mark Macfarlane | NEPA Coordinator |
| Rich Carver | Fire - Fuels Specialist (retired) |
| Paul Brna | Silviculturist |
| Charmane Powers | Botanist |
| Rod Jorgenson | Soil Scientist |
| Steve Bigby | District Road Manager |
| Les Moscoso | Recreational Planner |
| Gini Stoddard | Geographical Information Systems |
| Don Sargent | District Range Technician |
| Robin Gyorgyfalvy | Landscape Architect |
| Don Zettel | Archaeologist |
| Janine McFarland | Archaeologist |
| John Davis | Writer - Editor |
| Dick Dufuord | OHV Specialist (retired) |