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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

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Chapter 1 - INTRODUCTION

The Forest Service has prepared this Environmental Assessment (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. Project design criteria, mitigation measures 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.

BACKGROUND

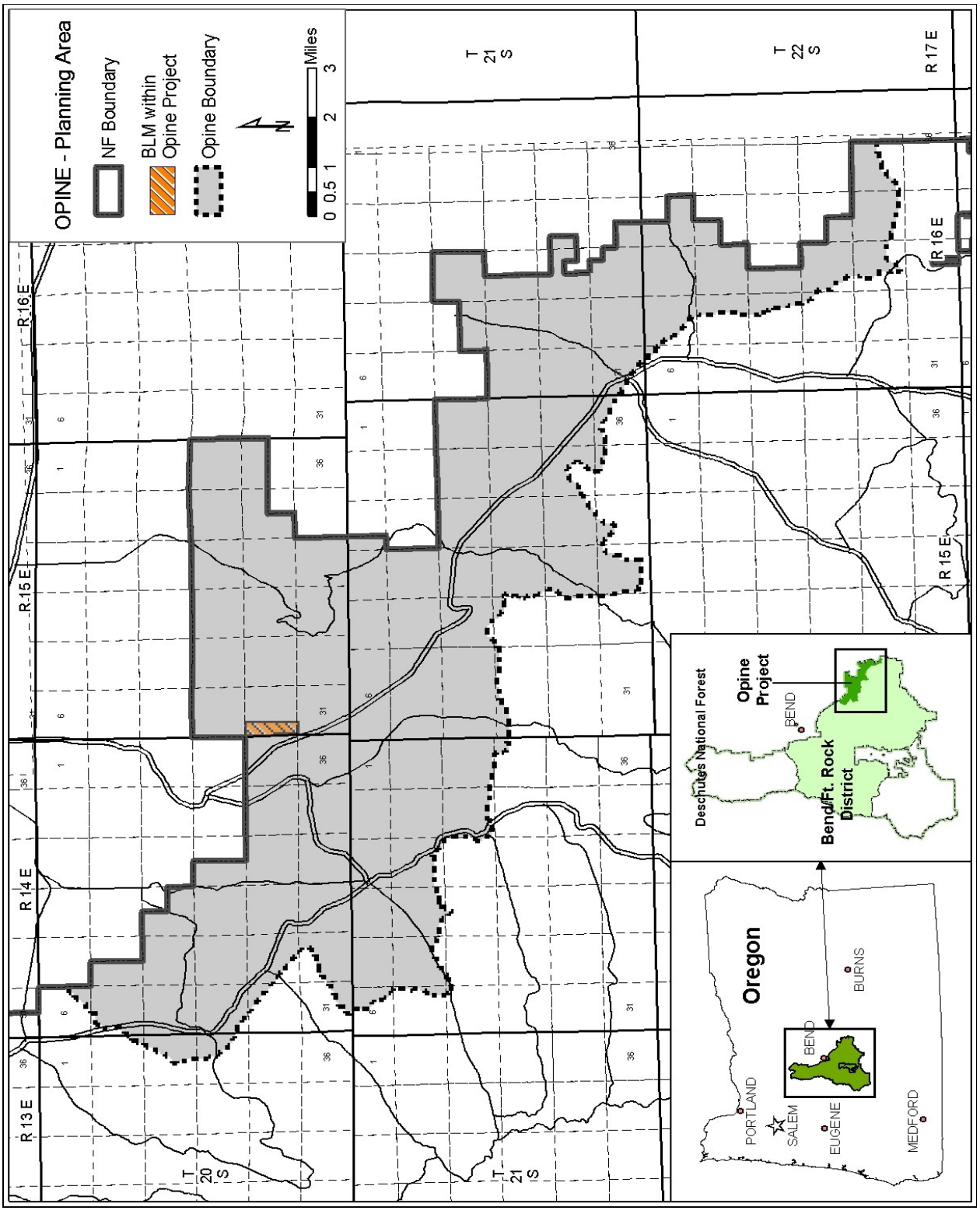
PROJECT AREA LOCATION

The planning area, 54,623 acres (Figure 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.

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.

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 T21S, R16E, Sections 3-6, 8-10, 16, 17, 20-22, and 26-28.

Figure 1 Vicinity Map - Opine Planning Area.



BACKGROUND

The planning area includes the Pine Mountain Observatory, located on nine (9) acres of National Forest lands, but owned and managed by the University of Oregon under a special use permit issued by the Deschutes National Forest. The planning area also includes all or portions of three (3) range allotments; Cinder Cone, Pine Mountain, and Sand Springs and 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.

The Bend-Ft. Rock Ranger District on the Deschutes National Forest has previously analyzed vegetation and natural fuel reduction treatments within the Opine planning area.

On June 25, 2004, Forest Supervisor Leslie A.C. Weldon signed a Decision Notice and Finding of No Significant Impact for the Pine Mountain Observatory Master Plan EA. This decision increased the special use permit area from four (4) acres to nine (9) acres, authorized the construction of new facilities within the new permit area, and authorized the development of a vegetation management plan for the long-term management of vegetation within the permit boundaries to reduce the risk of wildfire and to maintain telescope views. Short-term vegetation management activities to further reduce the risk of fire around the Observatory and within the observatory special use permit area are proposed by this environmental assessment (EA), which were not included in the observatory decision. 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 that decision.

On July 7, 2004, Forest Supervisor Weldon signed a Decision Notice and Finding of Notice of No Significant Impact for the Cinder Hill Range Allotment EA reauthorizing grazing within the Pine Mountain and Cinder Cone Allotments, all or portions of which are located within the Opine Vegetation Management EA planning area. That decision also authorized the construction of new fence lines and other range improvements and reconfigured pasture and allotment boundaries. 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 that decision.

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

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.

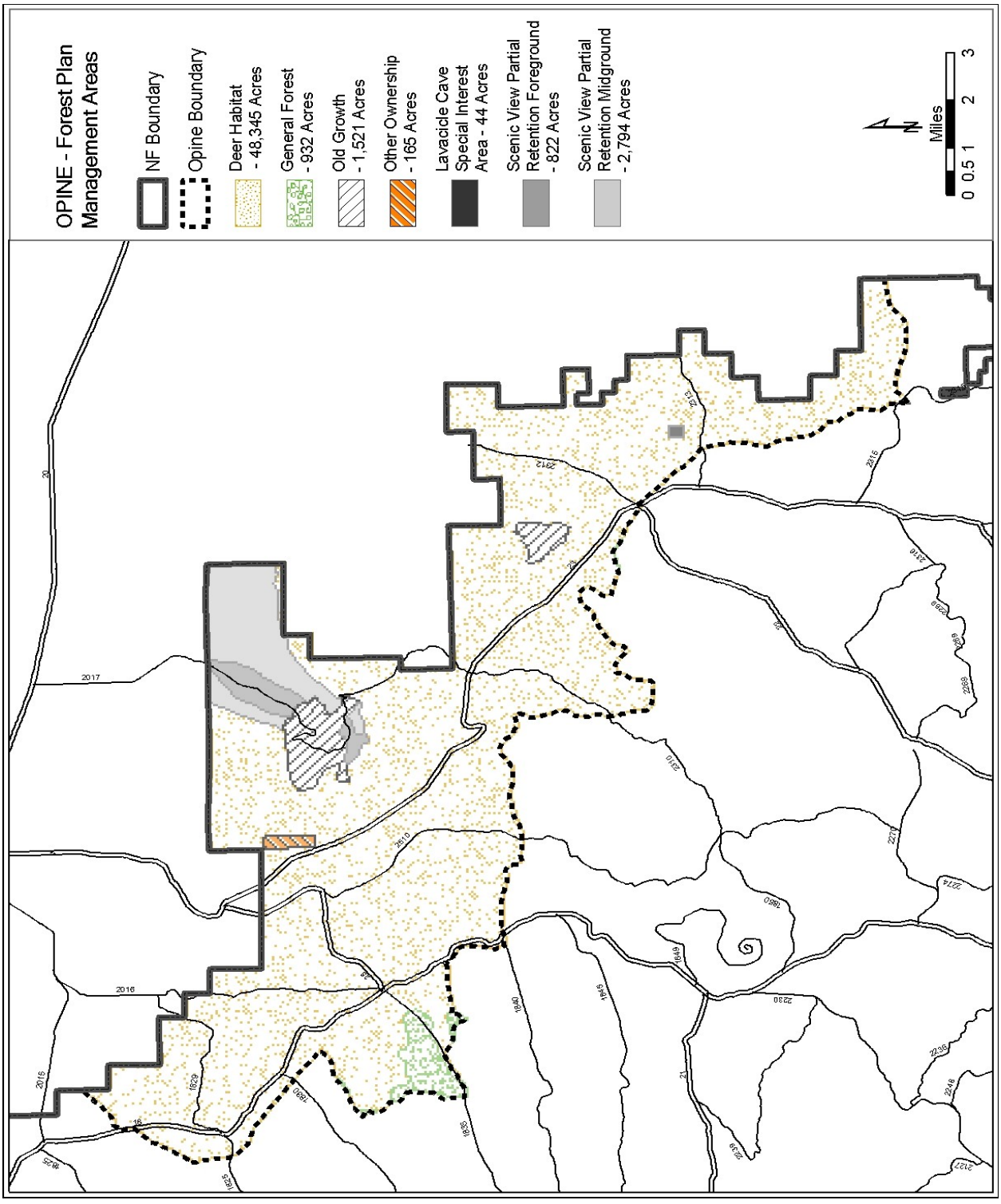
There are no perennial streams, lakes, or other permanent water bodies within the planning area boundary. The Deschutes Wild and Scenic River is approximately 17 air miles due west from the project area.

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 planning area contains cultural resources and populations of noxious weeds.

The ***Deschutes National Forest Land and Resource Management Plan*** (1990) (LRMP) identifies four (4) main management area (MA) allocations within the project area (Figure 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). No activities are proposed within the MA-1 allocation.

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



PURPOSE OF AND NEED FOR ACTION

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 providing a commercially viable small (to 16 inches diameter at breast height (dbh)) and medium diameter (16 to 21 inches dbh) tree harvest. Vegetation management and fuel reduction activities are intended to reduce the risk of high intensity, stand replacement wildfire, reduce the risk of bark beetle infestations, protect developments such as the Pine Mountain Observatory, electronic sites, transmission lines, range improvements, and other similar improvements and facilities from large-scale wildfire, improve long-term ecosystem health, productivity, and resilience to disturbance; accelerate the dominance of ponderosa pine and the growth of young stands; and reduce the distribution and numbers of encroaching juniper and ponderosa pine in shrub and grass dominated environments. Activities are also intended to move toward improving conditions within all management allocations, and specifically within the Deer Habitat, Scenic Views, and Old Growth Management Area (MA -7, MA-9, and MA-15 respectively) land allocations.

The purpose of the Opine Vegetation Management project is to:

- Provide an environment of reduced fire risk for forest users, permittees, and adjacent public and private landowners;
- Transition toward more stable vegetative ecosystems by creating conditions that are more resilient and resistant to disturbance by fire, insects, and disease;
- Provide for commercial harvest of small and medium diameter trees (trees less than 21 inches dbh) to provide material for local mills and provide local employment opportunities.
- Balance access and use with natural resource objectives;
- Protect and enhance range and wildlife habitat; and
- Maintain or enhance scenic views.

Fuels and Vegetation: Historically, low intensity fires maintained and thinned rangeland and ponderosa pine forest areas on a one (1) to 35 year return interval. Fire in lodgepole pine forest areas historically involved stand replacement fires on longer return intervals, from 35 to 100 or more years (Silvicultural Specialist Report, page 3). With the initiation of wildfire suppression and timber harvest in the early 1900s, the Opine planning area has experienced changes in forest stand density, forest and range composition, and public use.

An estimated 20 percent of the forested stands in the planning area are sufficiently dense to be at risk of bark beetle attack.

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.

Sixty-seven (67) percent of the planning area is considered to be forested, including 26,207 acres of dry ponderosa pine type (48 percent of the planning area) and 10,444 acres of lodgepole pine/dry shrub type (19 percent of the planning area). Sixty-six (66) percent of the ponderosa pine type acreage (17,126 acres) consists of primarily single story pine stands in the stand initiation (27 percent of the total ponderosa pine acreage) or stem exclusion, open, or closed canopy stages (39 percent of the ponderosa

pine acreage). Only two (2) percent (646 acres) of the ponderosa pine acreage consists of single story, large diameter ponderosa pine with an additional 20 percent (5,219 acres) consisting of multi-storied stands with large diameter ponderosa pine.

Within the lodgepole/dry shrub types, 49 percent of the acres (5,144 acres) contain stands in the stand initiation, stem exclusion, open canopy, or closed canopy stages. The remaining 51 percent (5,303 acres) of the type acreage, contains stands in the understory re-initiation, multi-strata with and without large trees, or single strata stands with large trees.

It is currently impractical to rely on natural successional 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, but to manage stands that are currently at risk to bark beetle infestation due to overstocked trees.

Wildlife Habitat: Almost 89 percent (48,345 acres) of the planning area is designated by the LRMP as deer habitat land allocation. The Oregon Department of Fish and Wildlife (ODFW) has also designated these acres as biological winter range. The remainder of the acreage is identified as summer range. The LRMP has no summer range allocation for deer. There are no acres in the planning area identified as transitional range for deer.

The planning area includes all or portions of five (5) winter range habitat units (WHRU): Tepee Draw, Potholes, Pine Mountain, Mahogany, and Lavacicle. WHRUs are areas within the biological winter range of mule deer and range in size from 10,000 to 20,000 acres. Biological winter range is defined as being an area utilized by deer during the winter months regardless of the LRMP land allocation designation.

Hiding cover is variable across the planning area ranging from zero in some management allocations and in some of the WRHUs to a maximum of 39 percent in the old growth allocation in the Pine Mountain WRHU. Considering forested only acres, range in cover is slightly greater, ranging from zero to a maximum of 43 percent in the General Forest allocation and in the old growth allocation in the Mahogany WRHU. The average cover across the planning area averages approximately 11 percent but increases to 21 percent when only the forested acres are included (Wildlife Report, Table 2, pages 5-6). Hiding cover for mule deer is generally of low quality in most ponderosa pine stands, but is of higher quality in lodgepole pine stands that contain regeneration. Extensive areas of xeric shrublands do not provide hiding cover under current definitions. Within the deer habitat allocation (MA-7), the objective is to have 40 percent of the land area in cover with one quarter of that (10 percent) being in hiding cover (LRMP page 4-113). Outside of the MA-7 allocation (deer summer range), forest-wide standard and guideline WL-54 requires hiding cover be present on at least 30 percent of the National Forest lands within each implementation unit (LRMP page 4-58).

Similar to hiding cover, thermal cover is also below LRMP standards and guides, ranging from two (2) to 20 percent within WRHUs and only six (6) percent within the deer habitat land allocation (MA-7) across the planning area. LRMP standards and guides state that "… tree canopy-cover conditions for optimal thermal protection may need to be compromised somewhat in order to moderate the risk of future catastrophic pine beetle damage. Cover should be managed at the highest percentage that will maintain healthy stand conditions with a low risk of catastrophic damage due to insects or disease … (S&G M7-5, LRMP page 4-113/114)."

Roads and motorized trails fragment big game habitat thereby reducing the effectiveness of winter foraging and fawning and calving areas. Road and motorized trail densities average almost five (5) miles per square mile across the planning area, ranging from 2.4 miles per square mile to almost eight (7.9) miles per square mile within WRHUs and almost six and one half (6.45) miles per square mile in non-

winter range areas. Much of the planning area is subject to a seasonal closure resulting in a decrease in open road/motorized trail mileage during deer season only. The average road/motorized trail density drops to 2.92 miles per square mile across the planning area. Within WRHUs, the averages range from less than one half (0.43) mile per square mile in the Lavacicle WRHU to a high of over six and one half (6.61) miles per square mile in the Tepee Draw WRHU. Non-winter range areas average approximately five and one half (5.46) miles per square mile.

The desired ratio of shrub habitat for deer forage is 1/3 early seral, 1/3 mid seral, and 1/3 late seral as outlined by the Deschutes National Forest Integrated Natural Fuels Management Strategy. A diversity of productive grasses, forbs, shrubs, and tree age classes are necessary for the vitality, resiliency, and continuation of deer habitat.

The large blocks of young, single-story (50 to 80 year old) ponderosa pine associated with the Tepee Draw and Potholes WRHUs have low numbers of snags and down woody debris. Wildlife species associated with historical large, single-story (late and old structure) ponderosa pine habitat such as the flammulated owl, mountain bluebird, and white-headed woodpecker, are probably less abundant than prior to logging and suppression of wildfire. Species associated with dense, multi-storied late and old structure stands such as the northern goshawk are probably more plentiful than historically. Species highly dependant upon wildfire disturbance such as the black-backed woodpecker, Lewis' woodpecker, and olive-sided flycatcher are also likely less plentiful today.

Greater (or western) sage-grouse are known to nest and raise broods within the planning area boundaries and specifically on the slopes of Pine Mountain. Extensive areas of historic habitat have experienced encroachment by coniferous trees, particularly western juniper and ponderosa pine, resulting in the reduction in the acreage and suitability of big sagebrush habitat types associated with this species.

Historic fire frequencies likely retained a higher percentage and greater distribution of grass dominated habitats than are present today. Fire suppression and control, initiated in the early 1900s, also likely resulted in an increase in the percentage and distribution of shrub dominated habitats further reducing the percentage and distribution of grass dominated habitats. Fire suppression and control activities also created conditions conducive to the expansion of juniper and ponderosa pine into shrub and grass habitats further reducing the percentages and distributions of both grass and shrub habitats. These reductions have reduced available forage and browse for a variety of wildlife species and forage for domestic livestock.

Scenic Quality: Seven (7) percent, 3,616 acres, of the planning area is located within the MA-9, Scenic Views, land allocation of the LRMP. All of these acres are located on Pine Mountain. 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. Visitors to Pine Mountain have historically enjoyed open views into a diverse mix of vegetation with stands of classic mature and old ponderosa pine. Views today are more closed and blocked by dense screens of less diverse vegetation including dense thickets of small diameter trees. Viewing opportunities are more limited to small areas of the landscape or night skies or restricted to fewer and smaller areas.

PROPOSED ACTION

This alternative (Alternative 2) proposes a variety of vegetation (commercial and non-commercial thinning and rangeland enhancement) and fuels reduction treatments on 26,840 acres including 6,670 acres of vegetation treatments in ponderosa pine and lodgepole pine stands, 507 acres of rangeland enhancement, and 19,663 acres of fuel reduction treatments in xeric shrublands and forest stands. This is 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 1 summarizes the treatments by unit.

Table 1 Proposed Treatments by Unit - Alternative 2

TREATMENT TYPE	UNIT NUMBER[1]	ACRES[2]
VEGETATION TREATMENTS		
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[3]
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	2,547
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
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, H28	146
W/Subsoiling	H19, H28	22
Slash Treatment – Machine Pile & Burn	H19, H28	(146)
W/Planting	H19	(38)
W/Natural Regeneration	H28	(108)
Small Tree Harvest (Trees to 16 inches dbh)		
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		
W/Underburning	P03-18, P22, SD01-06, SD08	2,002
W/Burning Beneath the Dripline	P19, P21, SD07	285
SUBTOTAL[4]		**6,660**

[1] H – Commercial harvest unit (trees generally 8-21 inches dbh).. P – Non-commercial harvest unit (trees generally less than 8 inches dbh). F – Fuel treatment unit.

[2] 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.

[3] 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.

[4] This total is calculated by adding the number of acres proposed for commercial and non-commercial harvest (including regeneration harvest) only. .

TREATMENT TYPE	UNIT NUMBER[1]	ACRES[2]
FUEL REDUCTION TREATMENTS		
Pretreat[5] & 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
Mow	F08, F19, F33	192
Underburn	F02-03, F07, F12-13, F18, F24, F39	5,260
Underburn Beneath Tree Dripline	F25-27, F32	2,064
SUBTOTAL		19,663
RANGE AND SAGE-GROUSE ENHANCEMENT		
Range Enhancement -Falling of Trees 9 inches DBH & Smaller; Mowing	R1A, R1B, R2A, R2B, R3East, R3West	507
Mowing	3A East, 3A West, R1B	183
Sage-Grouse Habitat Enhancement – Falling of Juniper to 14 inches DBH and Ponderosa Pine to 16 inches DBH		0
SUBTOTAL		507
TOTAL[6]		26,840

Figures 3a–c and 4a-c (pages 1-10 through 1-15) display proposed vegetation and fuel reduction treatment units. The proposed actions are more completely described in the following discussion.

This alternative would authorize the treatment of 6,670 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 would include commercial thinning (trees between eight (8) and 21 inches dbh) on 1,620 acres; 2,547 acres of commercial thinning with follow-up non-commercial thinning (trees generally less than eight (8) inches dbh) of the residual understory; non-commercial thinning of 2,347 acres, and the regeneration harvest of 146 acres. Regeneration harvest would include 38 acres of clearcutting and 108 acres of shelterwood cutting. Regeneration harvest would not cut trees 21 inches dbh and larger.

[5] 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.

[6] 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 3a Vegetation Treatment Units Tepee Draw- Alternative 2.

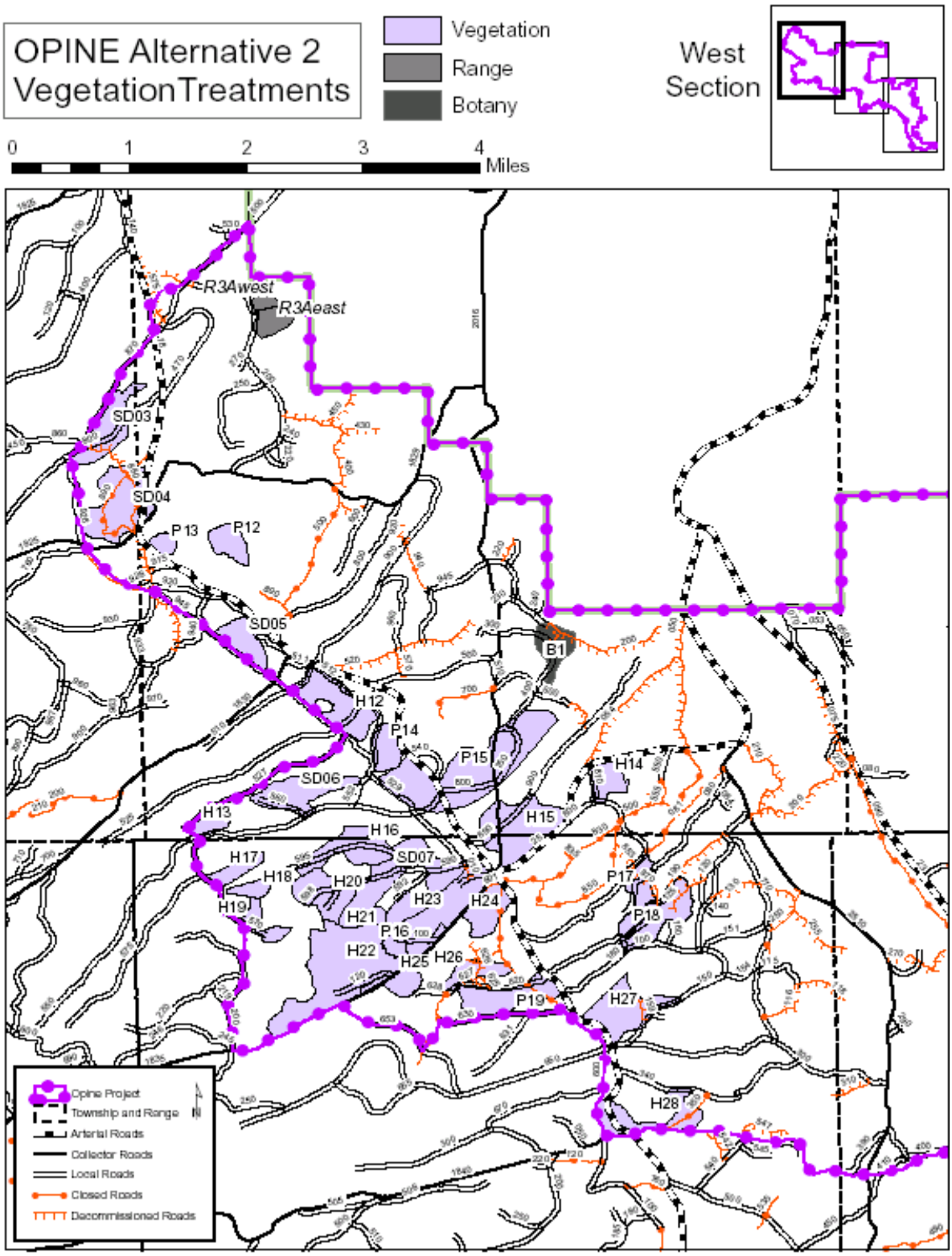


Figure 3b – Vegetation Treatment Units Pine Mountain - Alternative 2.

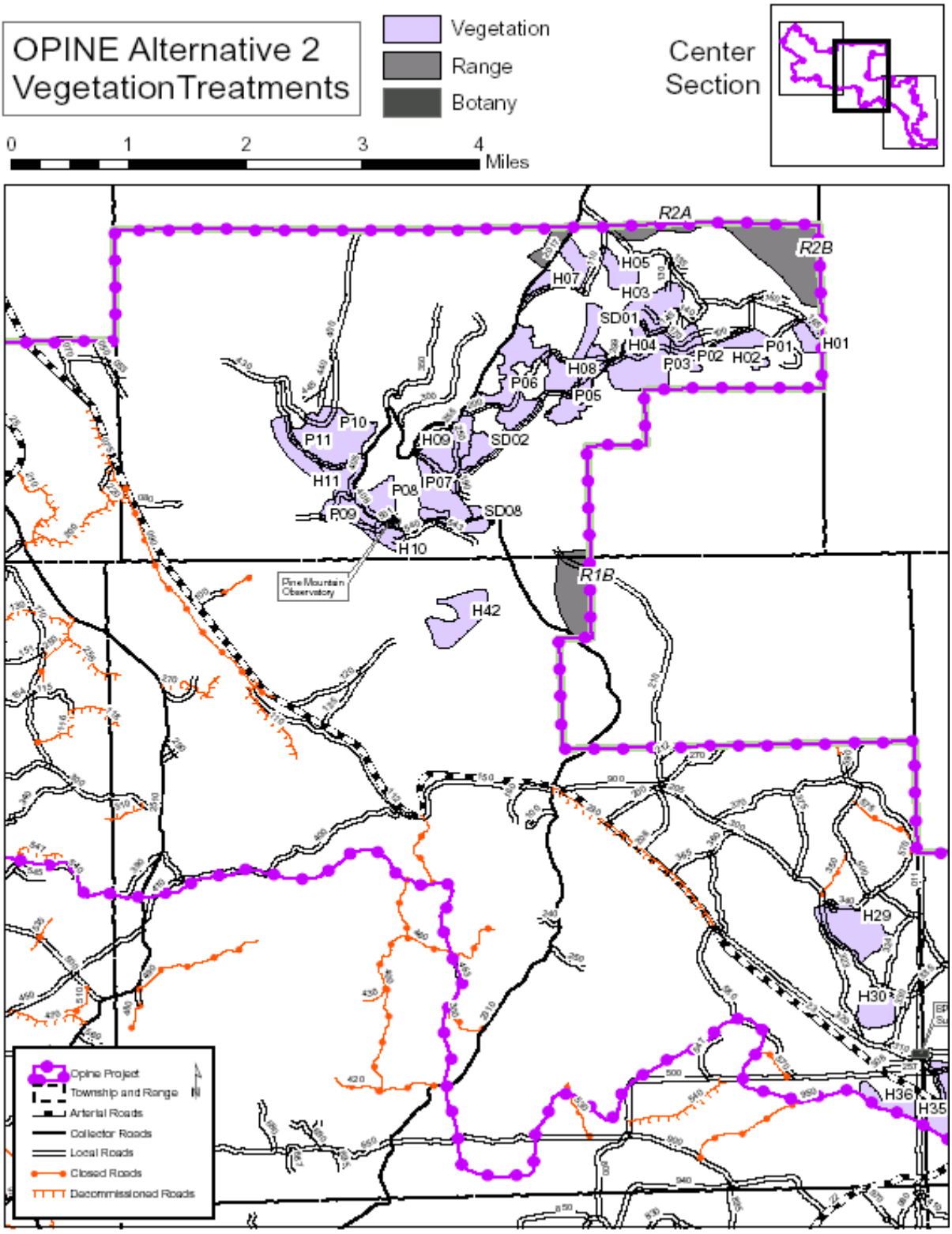


Figure 3c - Vegetation Treatment Units Sand Springs - Alternative 2.

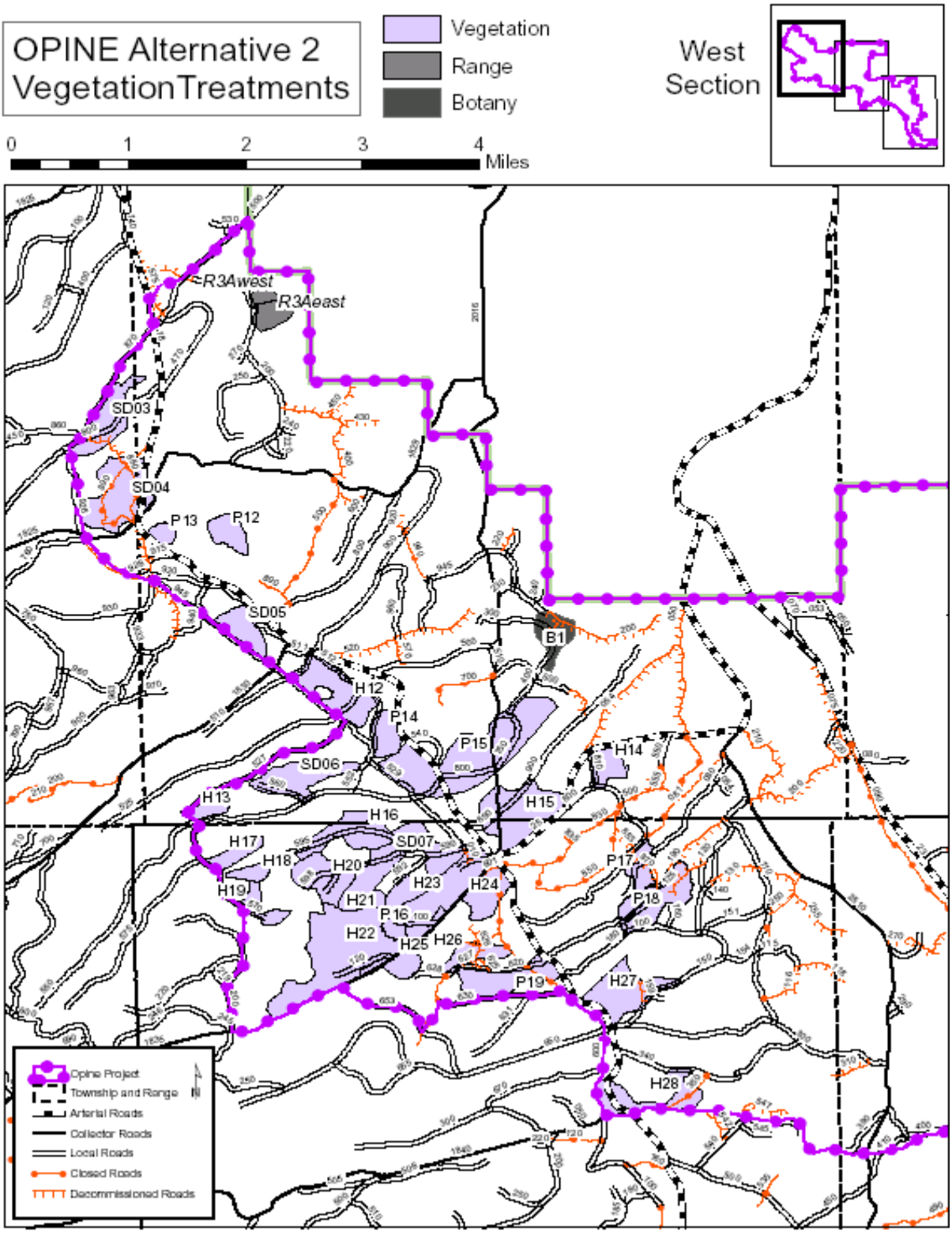


Figure 4a Alternative 2 Fuel Treatment Units - Tepee Draw

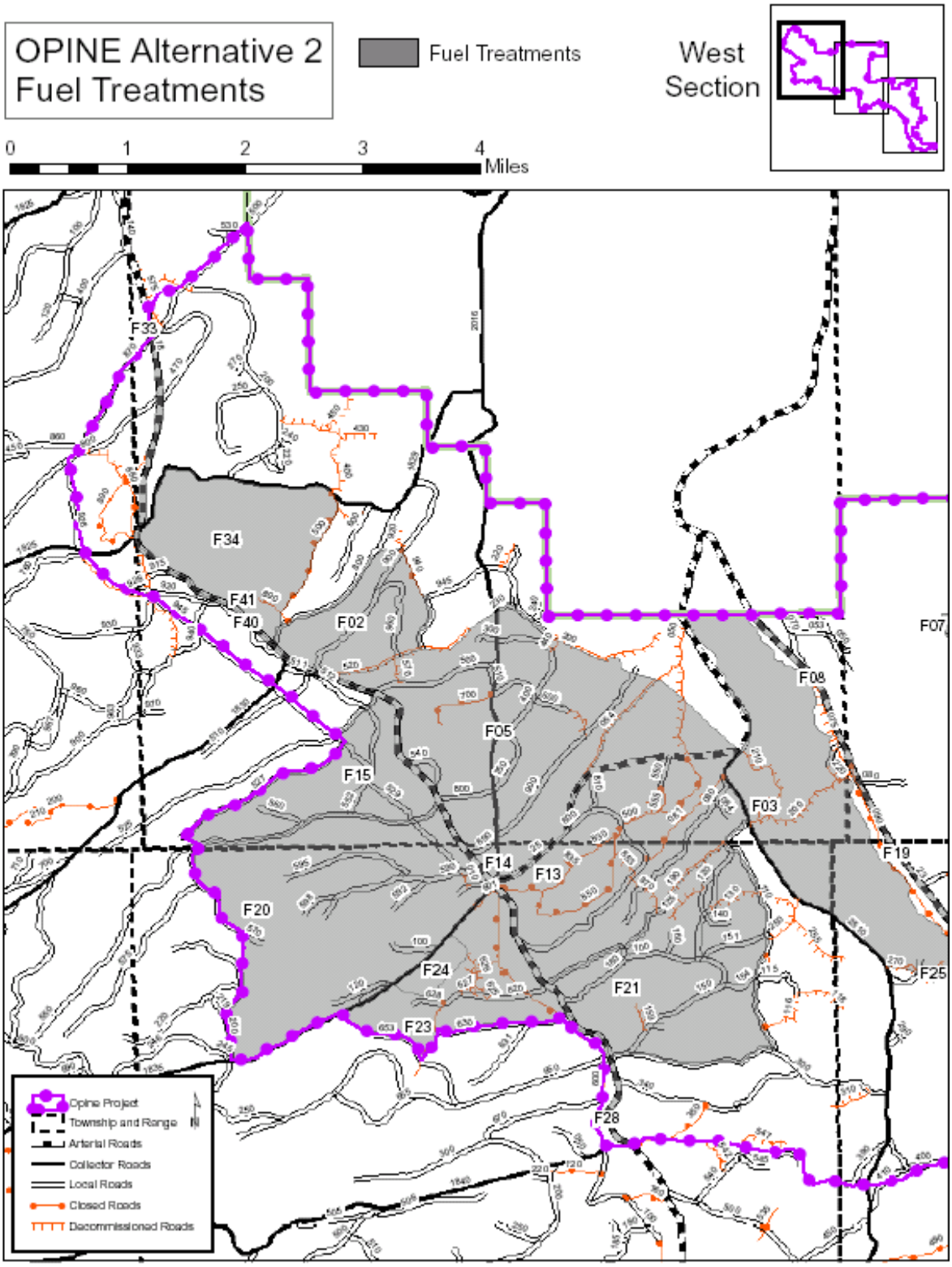


Figure 4b 1 Alternative 2 Fuel Treatment Units - Pine Mountain

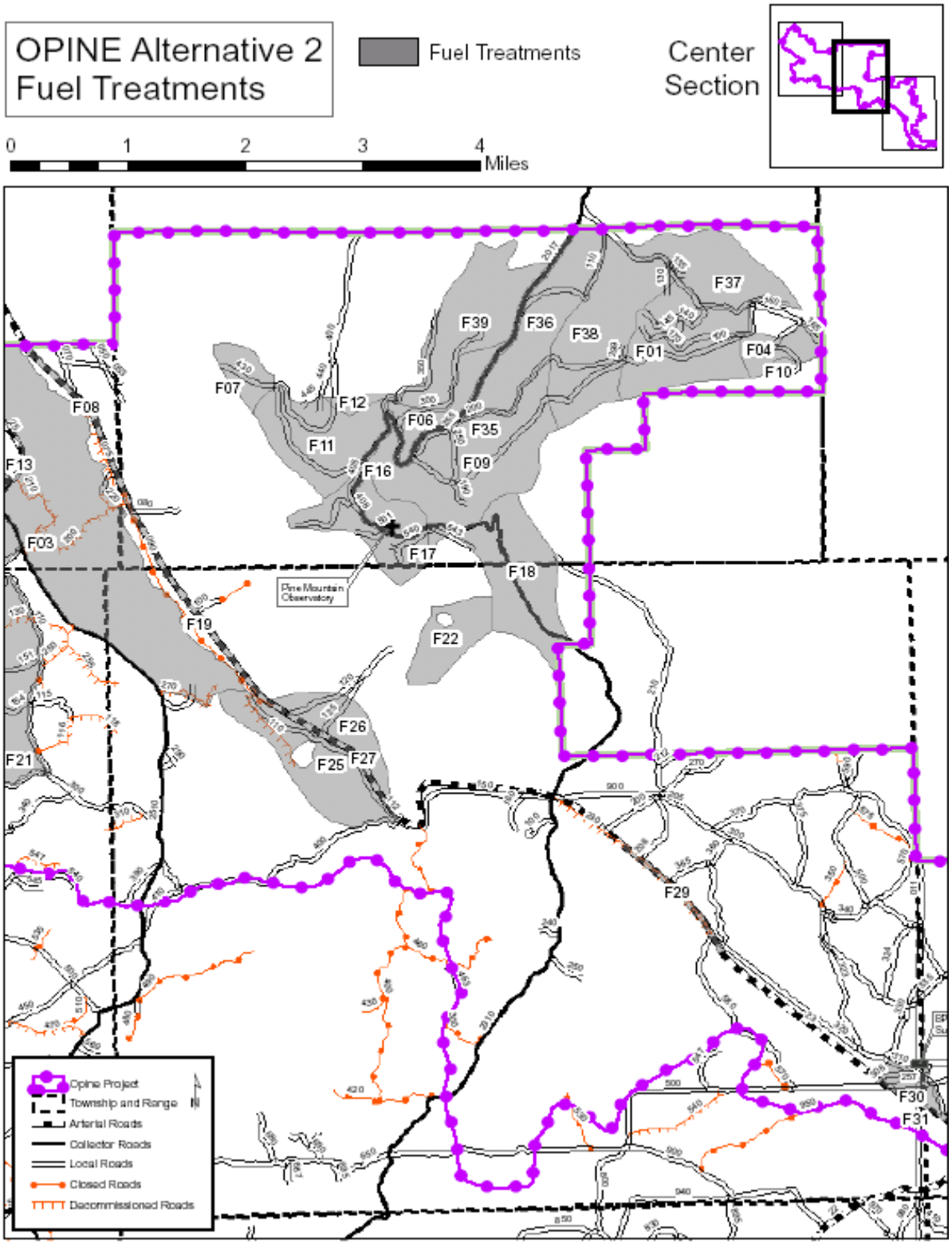
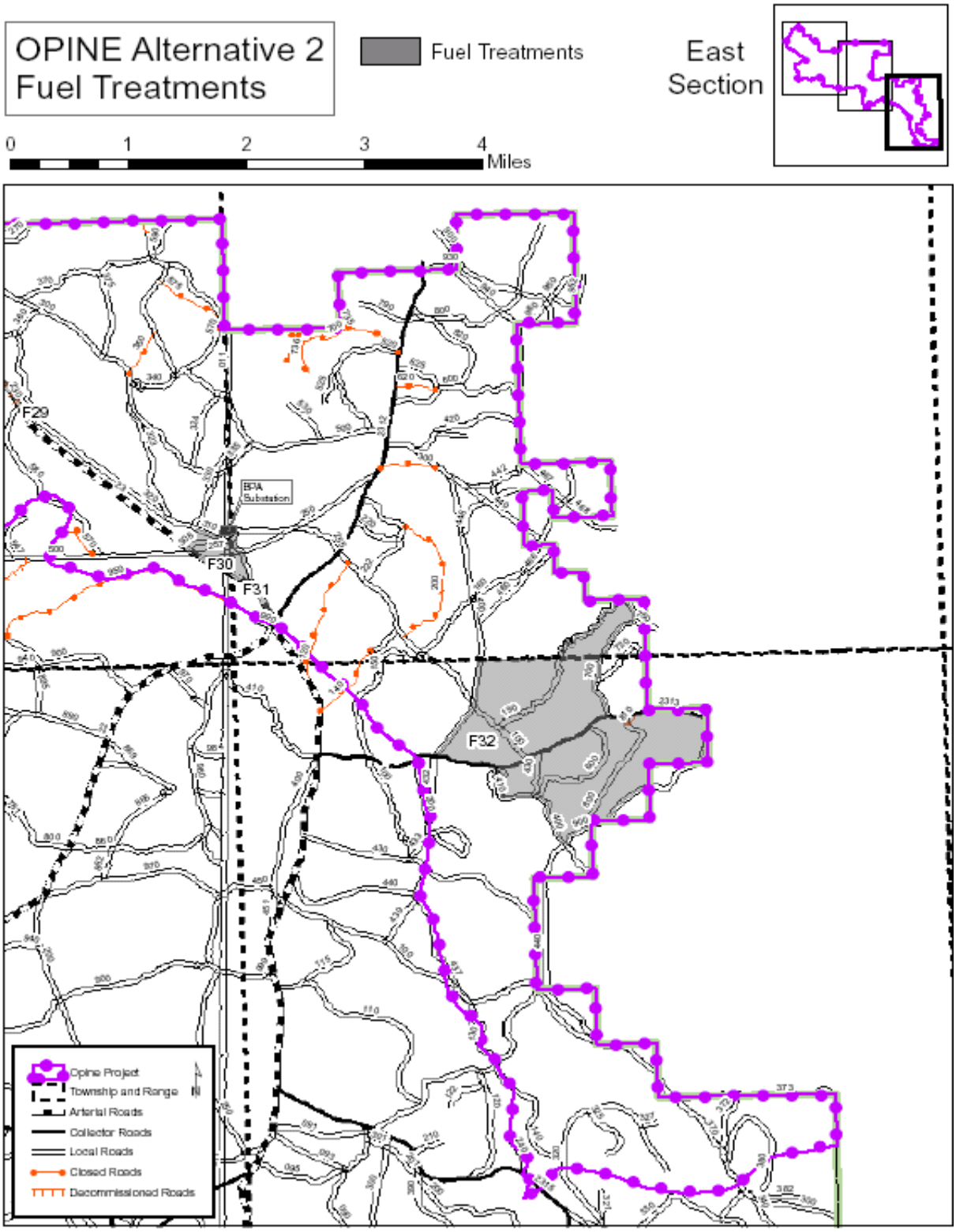


Figure 4c 1 Alternative 2 Fuel Treatment Units - Sand Springs



Commercial harvest activities, both thinning and regeneration harvest, would include the use of ground based equipment; specifically track or wheel mounted mechanical harvesters with boom reaches of at least 17 feet and rubber tired skidders with grapples and winches with chokers capable of pulling at least 75 feet of bull line. 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 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.

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 there are commercial markets 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 with individuals using chain saws. Mechanized equipment would not be used in units P1 and P2.

Six units totaling 507 acres would have encroaching trees, primarily western juniper and ponderosa pine, removed to improve range and wildlife habitat. Falling would be done by hand using chain saws with the trees left on site. No trees over nine (9) inches dbh would be cut. Slash would be treated by lopping and scattering. Mowing would be used on 183 of those acres (units R3 East, R3 West, and R1B) to reduce brush competition and encourage development of grass and forbs. Mowing could also be used to remove encroaching junipers in units R3 East and West in lieu of hand falling. Mowing would be accomplished using a John Deere 6400 or comparable wheeled tractor with a mechanical mower. Vegetation would be mowed to a height of approximately six (6) to eight (8) inches. Slopes exceeding 25 percent would not be mowed. Prescribe fire would be utilized in unit R1A (39 acres) and the stepper slopes (slopes over 25 percent) of unit R1B to reduce shrub densities, particularly of manzanita.

No acres would be treated to specifically maintain or enhance habitat for the greater sage-grouse. Approximately 2,782 acres of proposed vegetation and fuels treatments and all 507 acres of range enhancement are proposed within historic sage-grouse habitat. This includes 445 acres of vegetation treatments, approximately 404 acres of combined vegetation and fuels treatments, and 1,933 acres of only fuels treatments in addition to the 507 acres of rangeland improvement. Treatment prescriptions for proposed treatment units would not be changed to improve sage-grouse habitat beyond that which would be accomplished to meet vegetation and/or fuels objectives.

Slash created by harvest operations on 6,290 acres would be treated by lopping and scattering using hand tools including chain saws. No post-harvest slash treatment would be applied on 327 acres. The 146 acres of regeneration harvest would have the slash piled by a Case 1150 or comparable crawler tractor and the piles burned.

Additionally, 3,704 harvest acres would also have non-harvest related fuel reduction accomplished by underburning. Burning beneath the dripline of residual trees to reduce non-harvest fuels would be accomplished on 1,608 acres. The remaining 1,358 acres would have no additional fuel reduction treatments applied.

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 additional site preparation would involve clearing a space up to 2x2 foot square using a hoedad, planting shovel or other similar tool. The remaining 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 hoedads, planting shovels or other similar tools.

Approximately 11 acres of small openings contained within unit H23, a 43 acre proposed commercial thinning unit, are proposed for planting. 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, the seedlings would be protected with vexar-type typing.

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). Planting would occur between the existing researcher's quarters and Road 2017 to provide additional screening from the road, reduce light population 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.

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 closed and obliterated upon completion of harvest activities using a D-6 or comparable crawler 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 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, pages 18-19). 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 with three to five teeth 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, page 18-19). Sixteen (16) acres would be subsoiled, primarily to obliterate and decommission system roads in units H10 and H23 and to rehabilitate acres impacted by machine piling following shelterwood harvest in unit H28.

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, page 18-19). A total of 10 acres would be subsoiled to reduce detrimental impacts to either 20 percent (unit P19) or below the current level, 23 percent versus the current 25 percent (unit P04)

This alternative also proposes fuel reduction treatments on an additional 19,663 acres. Proposed treatments would reduce the risk of a wildfire damaging or destroying structures at the Pine Mountain Observatory and facilities at the Antelope and Pine Mountain electronic sites. Treatments along Forest Roads (FR) 18, 23, and 2017, major travel routes within the planning area, would improve safety for visitors and firefighters entering and leaving the planning area. Treatments would also reduce 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 less than four (4) inches dbh 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 less than four (4) inches dbh followed by machine piling the slash in random locations using a D-6 (or comparable) crawler tractor with a brush rake.. All piles would be burned and residual vegetation mowed using a John Deere 85 hp (or comparable) wheeled tractor or an ASV Posi-Track All Season tracked vehicle (or comparable) pulling a mechanical mower. Vegetation height after mowing would be at least six to eight (6-8) 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 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 5,260 acres.

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

All prescribe burn treatments would be ignited by hand or manual means. Aerial ignition would not be used on any units.

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 ASV Posi-Track 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, machine and any incidental hand, 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.

To determine the effects of mowing on the green tinged paintbrush, a single unit (B1) totaling 66 acres would be established primarily within the boundaries of unit F05. Two (2) plots, one control and one that

would be mowed, totaling less than an acre in area, would be monitored to determine the impacts of mowing on the paintbrush.

The following projects included in this proposal are proposed for funding using Knutson-Vandenberg (KV) funds collected from commercial timber sales. 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. Required or essential KV projects must be funded before non-essential or non-required projects. If KV dollars are limited, projects are funded in order of priority. Unfunded projects are either funded through other sources or are not implemented until funding is obtained. Funded projects must be located within sale area boundaries.

- Required KV (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;
    5) Trapping for gopher control; and
    6) Tubing for animal damage control.

- Non-required KV (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 as identified in the Cinder Hill project;
    11) Old growth boundary marking;
    12) Non-commercial thinning; and
    13) Hand or grapple piling and burning of slash.

Road closures and decommissionings 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 13 miles of forest system roads would be closed or decommissioned. This includes the closure of approximately 3.1 miles and the decommissioning of approximately 9.7 miles. 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.

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.

Table 2 lists the roads proposed for closure and decommissioning and includes the number of miles affected. Figures 5a-c (pages 1-22 through 1-24) displays the specific roads and estimated miles proposed for closure.

Table 2 Proposed Road Closures and Decommissionings - Alternative 2.

Road	No. of 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.
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	0.42	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. Convert 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. Convert 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.

Road	No. of Miles	Status	Comments
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.

Roads would be closed using berms, gates, signing, camouflage using vegetation and/or native materials, or a combination of methods. Decommissioning would involve subsoiling or camouflaging with native vegetation and/or 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.

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. Table 3 displays the specific activities proposed and the roads on which those activities would be done.

Table 3 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 (2017500 Junction)	4.53
DRAINAGE WORK (ARMORING ROLLING DIPS, LEADOUTS, & OUTSLOPES, BRUSHING, AND SHAPING)			
2017	8.127 (2017500 Junction)	12.509 (23 Junction)	4.38
2310	0.000 (23 Junction)	3.000 (Project Bdy)	3.00

Figure 5a Alternative 2 Proposed Road Closures and Decommissionings – Tepee Draw

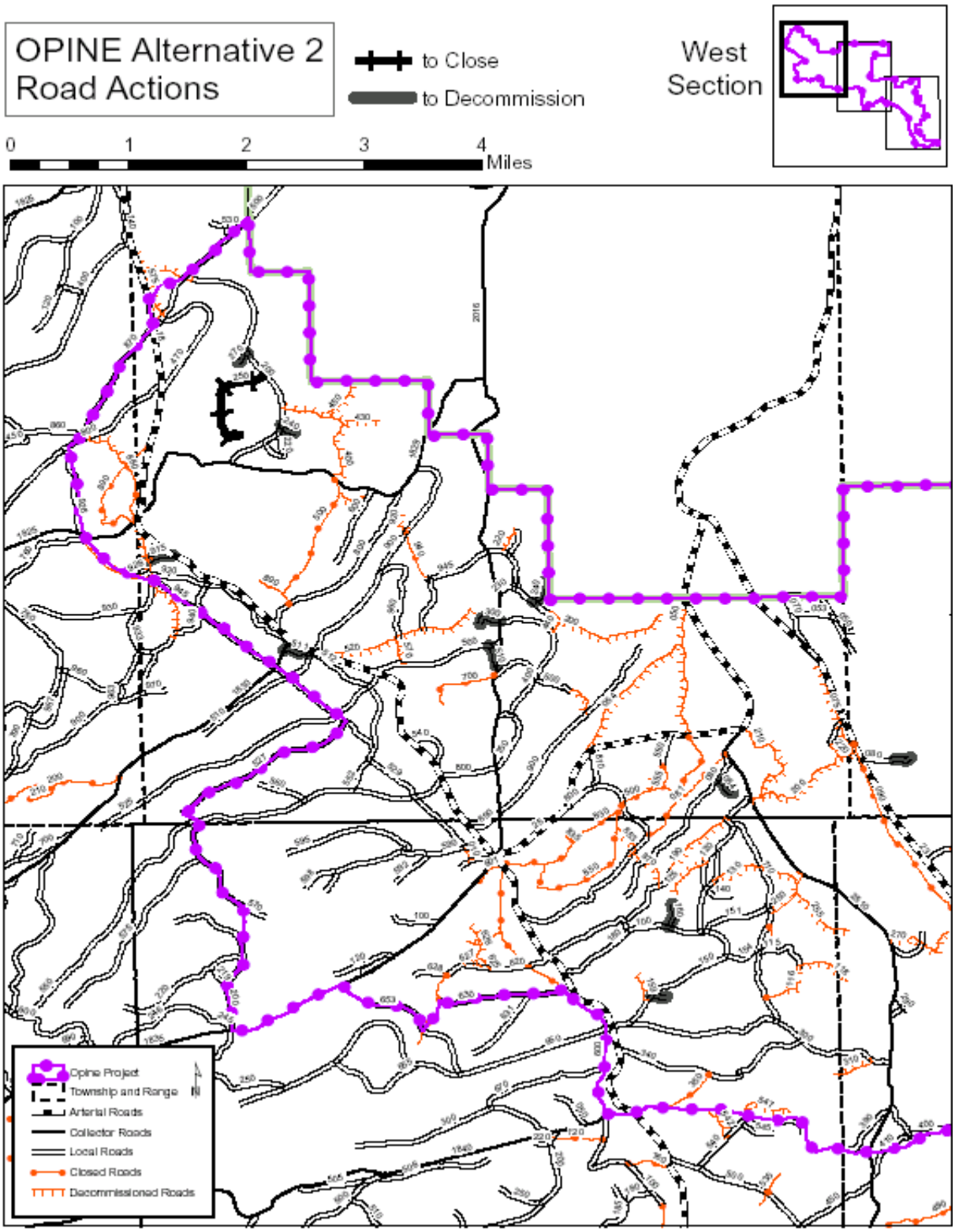


Figure 5b Alternative 2 Proposed Road Closures and Decommissionings – Pine Mountain

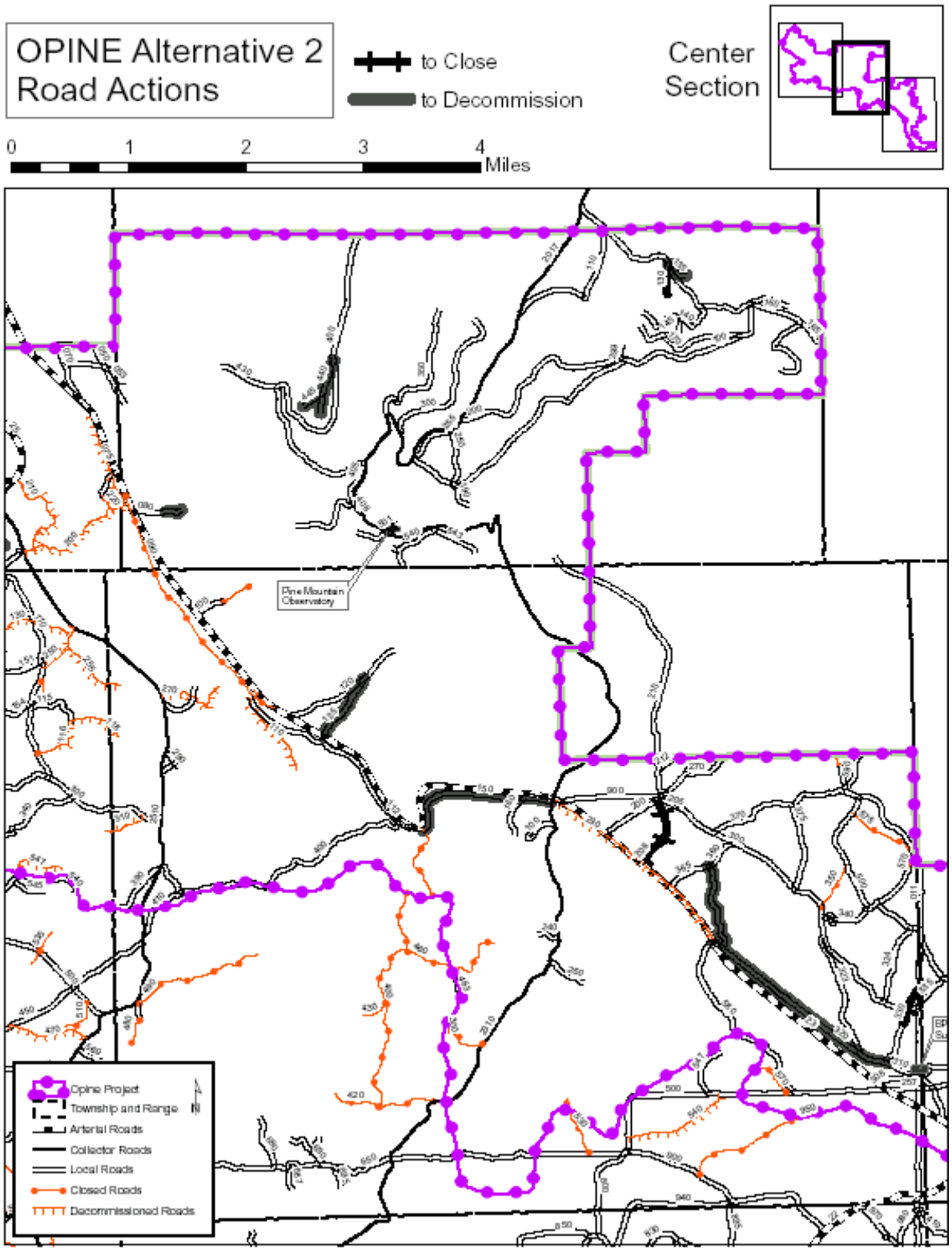
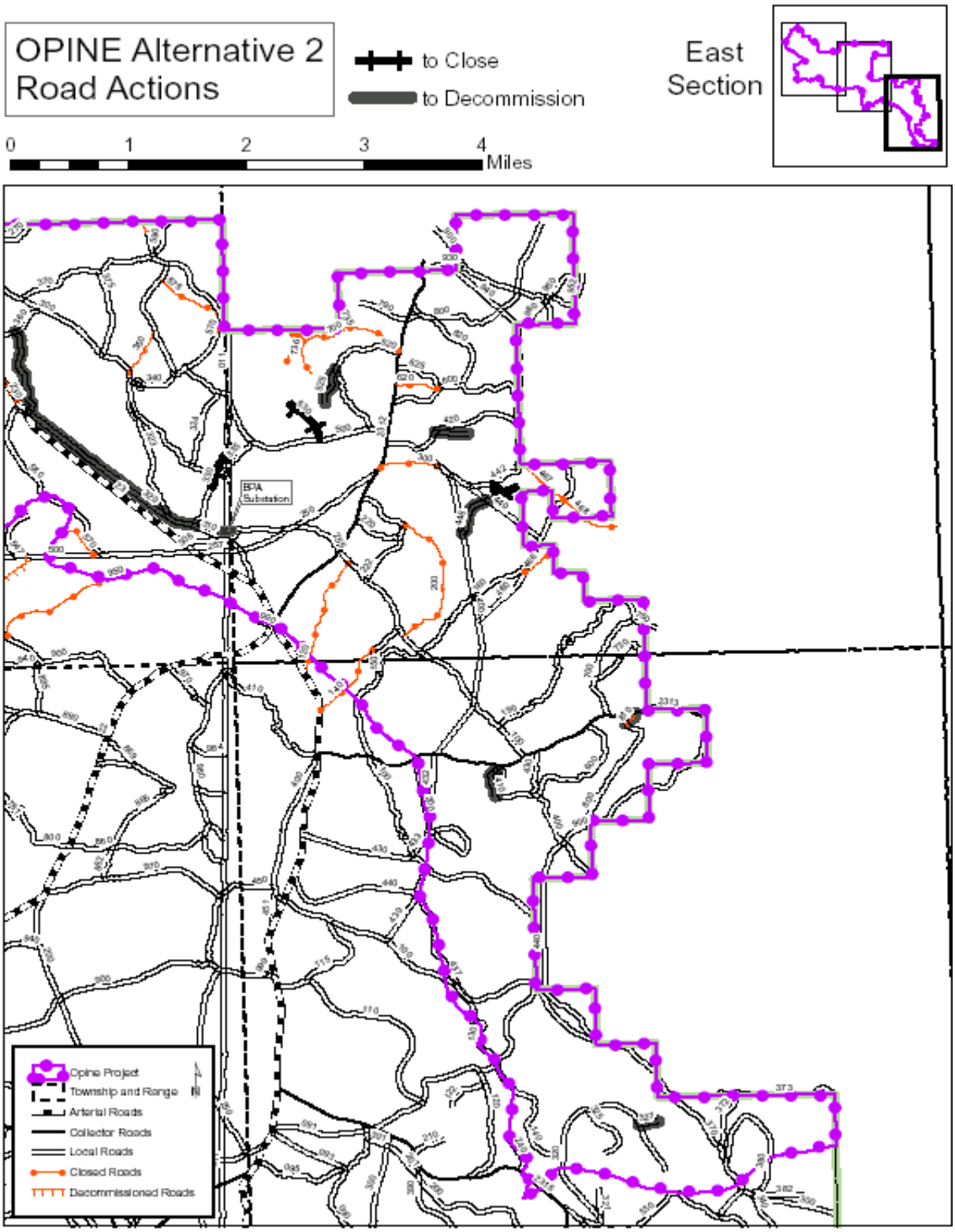


Figure 5c Alternative 2 Proposed Road Closures and Decommissionings – Sand Spring



Approximately 29.5 miles would be resurfaced with either a clay impregnated crushed aggregate or four (4) inch crushed aggregate. Approximately 7.4 miles would have drainage work, primarily armoring rolling dips, leadouts, and outslopes; shaping, and brushing. Additionally, approximately one-quarter (0.25) acres of trees located on the inside of the hairpin curve at the 2017/2017350 junction would be thinned at wide spacing and pruned to a height of either 50 percent of the tree height or 16 feet, whichever is greater to improve safety by increasing sight distances. This would include the felling of trees greater than four (4) inches dbh.

Proposed Forest Plan Amendments

The LRMP outlines objectives and standards and guidelines for maintaining cover for wildlife across the forest and specifically within the deer winter range (MA-7) land allocation. Existing cover conditions within the planning area indicate that neither the thermal cover objectives for deer winter range nor hiding cover standard and guideline for deer summer range are currently being met. It is expected that activities proposed under this project to reduce wildfire risk and intensity and to restore more resilient vegetation communities will result in further reductions in both thermal and hiding cover levels. Two site specific plan amendments are proposed. The first would waive the thermal cover objective of 30 percent of the land area being in thermal within the deer winter range land allocation (MA-7). The second would waive standard and guideline WL-54 which requires that 30 percent of the National Forest land within each implementation unit be in hiding cover. This waiver would apply to the deer summer range areas on Pine Mountain only (includes scenic views (MA-9) and old growth (MA-15).

MANAGEMENT AREAS & DIRECTION

The proposed actions respond to the goals and objectives, standards and guidelines described for the area in:

Deschutes National Forest Land and Resource Management Plan (LRMP) (1990) and it's accompanying Final Environmental Impact Statement as amended by the "Revised Continuation of Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales (Eastside Screens)." The LRMP was developed to guide all natural resource management activities and establish standards/guidelines for the Deschutes National Forest. The purpose of the LRMP is to provide for the use and protection of Forest resources, fulfill legislative requirements, and address local, regional, and national issues and concerns. The proposed actions will not meet the objectives for thermal cover in designated deer winter range or the standard and guideline for hiding cover in deer summer range on Pine Mountain (WL-54). As noted previously, site specific amendments to the thermal cover objective and the hiding cover standard and guideline are proposed as part of the proposed action.

The following summarizes the goals in each Management Allocation (MA) located within the planning area:

- **Deer Habitat (MA-7):** 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.

- **General Forest (MA-8):** Emphasize timber production while providing forage production, visual quality, wildlife habitat and recreation opportunities for public use and enjoyment.

- **Scenic Views (MA-9):** Provide Forest visitors with high quality scenery that represents the natural character of Central Oregon.

- **Old Growth (MA-15):** Provide naturally evolved old growth forest ecosystems for 1) habitat for plant and animal species associated with old growth forest ecosystems, 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.

In addition to the LRMP, the following documents were used where appropriate to provide additional guidance and direction in the development and implementation of the proposed actions.

1998 Deschutes National Forest Integrated Fuels Management Strategy (IFMS): "The IFMS provides guidance for prescribed fire, mechanical brush mowing, and small diameter tree thinning and release." "The IFMS Recommended Strategic Actions are not required to implement the natural fuels activities, but were developed to assist the Forest with program development towards meeting long-term goals in an integrated, adaptable and effective manner."

1995 Inland Native Fish Strategy (*INFISH*) - There are no identified perennial or intermittent streams, wetlands, lakes, ponds, or other water bodies within the Opine planning area. No riparian habitat conservation areas (RHCAs) have been identified within the planning area.

DECISION TO BE MADE

Based on this environmental assessment, resource specialists reports and biological evaluations, the Forest Supervisor, Deschutes National Forest, will decide whether to:

- Use mechanical shrub treatments, prescribed burning, non-commercial and commercial thinning, to 1) Commercially harvest small and medium diameter trees to provide an economic return; 2) improve forest health; 3) reduce natural fuels and wildfire risk; and 4) improve/protect wildlife habitat.

- Provide increased cover and structural diversity within deer winter range by planting tree seedlings on 49 acres including on approximately 38 acres following regeneration harvest (clearcutting).

- Trap or use vexar-type tubing, or a combination of methods to protect planted seedlings from damage or destruction associated with animal browsing or clipping on 49 acres including approximately 38 acres of regeneration harvest (clearcut) units; 11 acres of previously created openings within a proposed commercial harvest (thinning) unit; and approximately ¼ acre within the permit boundaries of the Pine Mountain Observatory special use permit area.

- Close and decommission roads within deer winter range to mitigate reductions in vegetation cover and improve habitat effectiveness.

- Amend the LRMP to waive the thermal cover objective of 30 percent of the area in thermal cover within the deer winter range (MA-7) land allocation within Opine planning area.

- Amend the LRMP to waive standard and guideline WL-54 requiring a hiding cover of at least 30 percent of the land area outside of the MA-7 land allocation.

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. This notification, through quarterly mailings, reached approximately 3,200 interested individuals and groups. Notification of the project has also been posted on the Deschutes and Ochoco National Forests and Crooked River National Grasslands website (www.fs.fed.us/r6/centraloregon/index.shtml) in the Projects and Plans section.

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 that requested comments regarding proposed road closures and decommissionings 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.

Comments Received From the Public

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 summarized in and used as issues used in alternative design, or are addressed under alternatives considered but eliminated from detailed analysis. No comments were received from the Confederated Tribes of the Warm Springs, the Burns Paiute, or Klamath Tribes.

ISSUES

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. Many of the comments have been addressed in the Proposed Action, alternative development, and analysis of the effects of actions. These comments were used to formulate issues and to design alternative activities or mitigations. Some comments were used to explore alternatives that were not further developed. 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 has been delayed and is likely to be incorporated into either the proposed forest plan amendment that addresses OHV use across the Deschutes National Forest and/or into 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. 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 easily distinguish between each alternative and how it responds to the issue. For a comparison of the alternatives see Chapter 2.

Key Issue #1: **Wildlife 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 1/3rd 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:***
  - Acres of deer winter range habitat treated by vegetation and/or fuels treatments.
  - Percentage of thermal and hiding cover after treatment.
  - Bitterbrush age/structure ratios.

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 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.

The Opine planning area contains approximately 29,541 acres of historic greater (western) sage-grouse habitat. Extensive areas of historic habitat have experienced encroachment by trees, particularly western juniper and ponderosa pine, thereby reducing the suitability of those habitats for sage-grouse. National Forest lands in the planning area currently provide nesting and brood rearing habitat; there are no known lek sites within the planning area boundary.

- ***Measurement Standard:***

  - Acres of historic sage-grouse habitat treated to reduce tree encroachment and stocking levels.

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 as 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.

Key Issue #3: **Wildfire Risk**

Fire exclusion (fire suppression) and the lack of hazardous fuel treatment 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 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, negative effects on 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.

Chapter 2 - ALTERNATIVES, INCLUDING THE PROPOSED ACTION

INTRODUCTION

This section provides discussion of a No Action Alternative and two (2) action alternatives. 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 the alternatives. 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.

Description of Treatments Common to Alternatives 2 (Proposed Action) and 3: Table 4 describes the treatments that are proposed and overall objectives for these treatments.

Table 4 Description of Thinning and Fuels Treatments and their Objectives.

TREATMENT TYPE	TREATMENTS	OBJECTIVES
Fuel Treatment Only	Mechanical Shrub Treatment[7]; Underburn[8] Pretreatment[9]	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[10]; Non-commercial Harvest[11]; 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; Maintain/enhance sage-grouse habitat: Maintain/enhance forage availability for livestock.
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. Improve range conditions for domestic livestock; Improve nesting and foraging habitat for sage-grouse.
Non-commercial Harvest	Non-commercial Thinning; Mechanical Shrub Treatment; Underburn	Reduce natural fuels to reduce risk of wildfire; Provide fuel break/ safety corridor; Create strategic fuel breaks; Improve forest health.

[7] **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.

[8] **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.

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

[10] **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.

[11] **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. Also includes the felling of scattered trees within sage-grouse habitat enhancement units and the removal of western juniper and ponderosa pine in range forage enhancement units.

Commercial harvest units would be whole tree yarded; skidding the entire tree a landing prior to removing the top and limbs. Sufficient slash material, including tops, limbs, and logs would be left within the unit to meet requirements for short and long-term soil productivity and to meet wildlife habitat needs and requirements. Slash piled on landings would be burned. Slash resulting from harvest operations that exceeds fuel prescription levels would be treated by lopping and scattering to reduce fuel loadings and the risk of a high intensity fire within the treatment unit. In regeneration harvest units, slash would be machine piled using a Case 1150 or comparable crawler tractor with a brush rake or a track mounted backhoe with a bucket or grapple and the piles burned. In non-commercial harvest units or units with a combination of commercial and non-commercial harvest, light concentrations of slash would be lopped and scattered. Heavier concentrations would be hand and/or machine piled on previously disturbed sites (skid trails, roads, etc.) and the piled burned prior to underburning. This would be followed by underburning on most units. Slash resulting from thinning operations within the Pine Mountain Observatory special use permit area would either be piled and burned or used for firewood by the Observatory or in the adjacent Pine Mountain Campground.

Alternative 1 (No Action)

This alternative provides a baseline that compares relative changes and their effects that would occur with implementation of proposed 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 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.

Removal of juniper and ponderosa pine to improve forage production would not be implemented.

No acres of historic sage-grouse habitat would be treated to maintain or enhance nesting and brood rearing habitat by removing or reducing the density and distribution of encroaching trees.

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. National Forest lands outside the boundaries of the East Fort Rock OHV trail system area would remain open to unrestricted motorized use. 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 acres of xeric shrubs would be mowed to also 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 to waive thermal cover objectives in deer winter (MA-7) and to waive the hiding cover standard and guideline for hiding cover in deer summer range (WL-54) would be made.

Alternative 2 (Proposed Action)

This alternative is described in the Proposed Action section of Chapter 1 and is not further discussed here

Alternative 3

This alternative is identical to Alternative 2 (described in Chapter 1, pages 1-7 through 1-24) except as described below. Table 5 (pages 2-4 and 2-5) displays the proposed treatments and Figures 6a-c and 7a-c (pages 2-6 through 2-11) display the unit locations for vegetation and fuel reduction treatments within the planning area.

This alternative proposes a variety of vegetation and fuels reduction treatments on 32,288 acres including 7,406 acres of vegetation treatments in ponderosa pine and lodgepole pine stands and 17,878 acres of fuel reduction treatments in xeric shrublands and forest stands. It would result in the production of 12,020 cunits or 6.2 million board feet of solid wood fiber.

This alternative would authorize the treatment of 7,406 acres of forest stands by commercial and non-commercial harvest to reduce stand densities and fuel loadings. This would include commercial thinning of 1,257 acres; 2,625 acres of commercial thinning with follow-up non-commercial thinning of the residual understory (trees generally less than eight (8) inches dbh); and non-commercial thinning of 3,524acres. There would be no regeneration harvest.

Commercial and non-commercial harvest would be accomplished using the same methods and types of machinery as described under Alternative 2.

Four units totaling 235 acres would be treated to improve range and wildlife conditions by removing encroaching ponderosa pine and juniper from historic xeric shrub communities. Mowing would be done on 133 acres of those acres to reduce shrub competition. Prescribe fire would be used on *** acres to reduce shrub competition, primarily manzanita.

Slash created by commercial and non-commercial harvest on 6,147 acres would be treated by lopping and scattering. There would be no machine piling and burning. There would be no slash treatment on 1,179 acres.

Fuel reduction treatments in harvest units would include 3,815 acres of underburning and 2,240 acres of burning beneath the driplines of residual trees. This would require the construction of two (2) miles of machine fireline adjacent to portions of units F01, F18, F38, and F39 (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. No additional fuel reduction treatments would be applied to 1,351 acres.

One quarter (0.25) acre within the Pine Mountain Observatory permit area boundary would be planted 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.

Table 5 Proposed Treatments - Alternative 3.

TREATMENT TYPE	UNIT NUMBER	ACRES[12]
VEGETATION TREATMENTS		
Small and Medium Tree harvest (Trees o 21 inches DBH)		
Commercial Harvest w/Non-Commercial Harvest	C303, C307-309, C311, C313, C314, C316-332, C335-337, C339	2,625
W/Subsoiling	C303, C308, C314, C324, C332, C336, C339	44
Slash Treatment		
Lop & Scatter	C303, C307-308, C311, C313, C314, C316-332, C335-337, C339	2,407
None	C309	138
Fuel Treatment		
Underburn	C303, C307, C308, C339	276
Burning beneath Dripline	C309, C311, C313, C314, C316-328, C332, C335-336, C339	1,887
None	C329-331, C337	462
Commercial Harvest w/o Non-Commercial Harvest	C301, C302, C304, C305, C310, C312, C315, C333, C334	1,257
W/Subsoiling	C302, C305,	3
Slash Treatment		
Lop & Scatter	C305, P322	216
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, C333, C334	826
SUBTOTAL		3,882
Small Tree Thinning (Trees Less than 8 inches dbh)[13]		
Non-Commercial Harvest	P301-317, P320-325, P328-346	3,524
W/Subsoiling	P305, P317, P321	1
Slash Treatment		
Lop & Scatter	P301-317, P320-325, P328-346	3,524
Fuel Treatment		
W/Underburn	P303-317, P320-325, P328-340, P345, P346	3,286
W/Burning beneath Dripline	P342-344	175
None	P301, P302, P341	63
SUBTOTAL		3,524
SUBTOTAL VEGETATION TREATMENTS[14]		**7,406**

[12] 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. .

[13] 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 including the possibility of such removal occurring.

[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.

TREATMENT TYPE	UNIT NUMBER	ACRES[12]
HABITAT AND RANGE ENHANCEMENT TREATMENTS		
Sage-grouse Enhancement – Removal of Encroaching Trees	SG1-16	6769
Range Enhancement	R1A, R1B, R3A	235
FUEL REDUCTION TREATMENTS[15]		
Pretreat & Underburn	F01, F04-06, F10, F11, F15, F20-23, F30, F34, F37, F38	9,523
Pretreat, Machine Pile, Burn Piles, & Mow	F28, F29, F31, F40	146
Pretreat, Hand Pile, Burn Piles, & Underburn	F09, F17	4,407
Pretreat, Mow, & Underburn	F14, F16, F35, F41	306
Mow	F33, F43, F45, F46	136
Underburn	FO3, F12, F13, F18, F24, F39, F42, F44	4,352
Underburn Beneath Tree Dripline	F25-F27, F32	2,008
SUBTOTAL[16]		**17,878**
TOTAL[17]		**32,288**

Access to harvest units C311, C313, C314, and P322 would require the construction of 1.05 miles of temporary road. These roads would be closed and 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) commercial harvest units (C302, C303, C305, C308, C314, C324, C332, C336, and C339) including seven (7) that also include non-commercial harvest (C303, C308, C314, C324, C332, C336, and C339) (Table 3-5, Soils Report pages **).

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 non-commercial harvest units P305, P317, and P321.

This alternative also proposes fuel reduction treatments on an additional 17,878 acres. Of this total, 9,523 acres would include pretreating by the falling of all trees less than four (4) inches dbh using chain saws and then underburning.

[15] These figures do not include acres previously included under vegetation treatments displayed previously.
[16] This figure only includes the gross number of unit acres. Acres treated with multiple treatments are not duplicated in the total.
[17] 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 5a Alternative 3 Vegetation Treatment Units – Tepee Draw

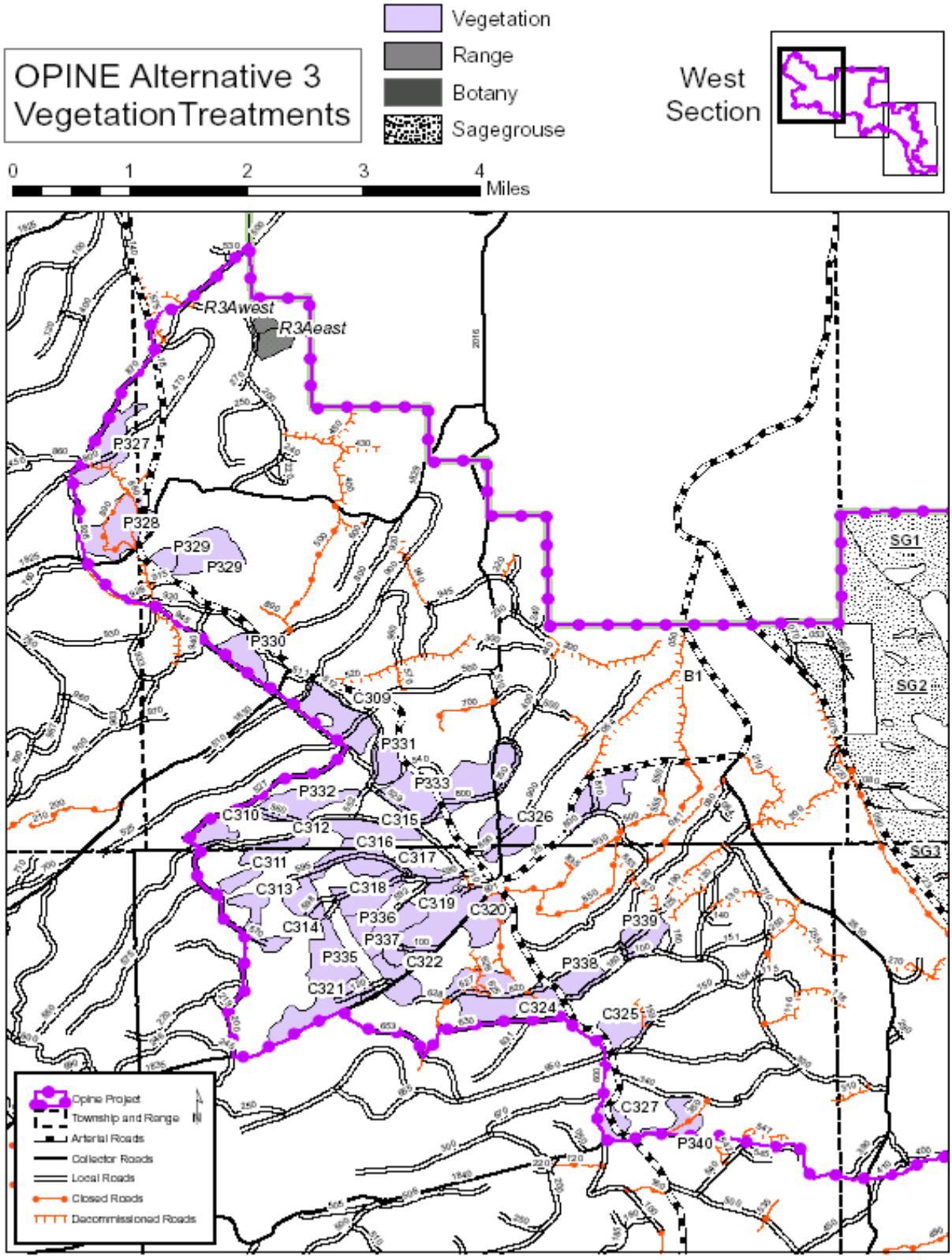


Figure 6b Alternative 3 Vegetation Treatment Units – Pine Mountain

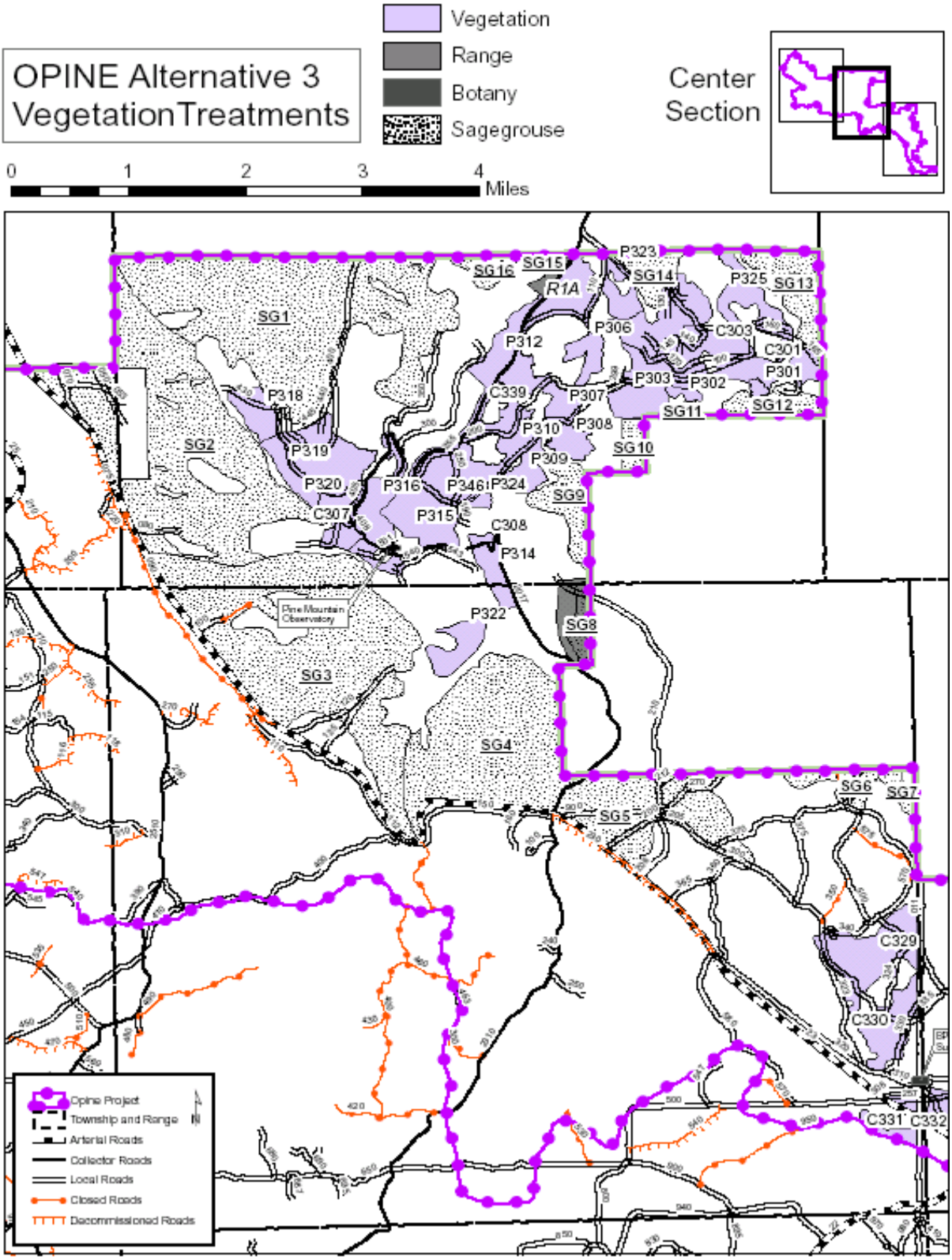


Figure 6c Alternative 3 Vegetation Treatment Units – Sand Springs

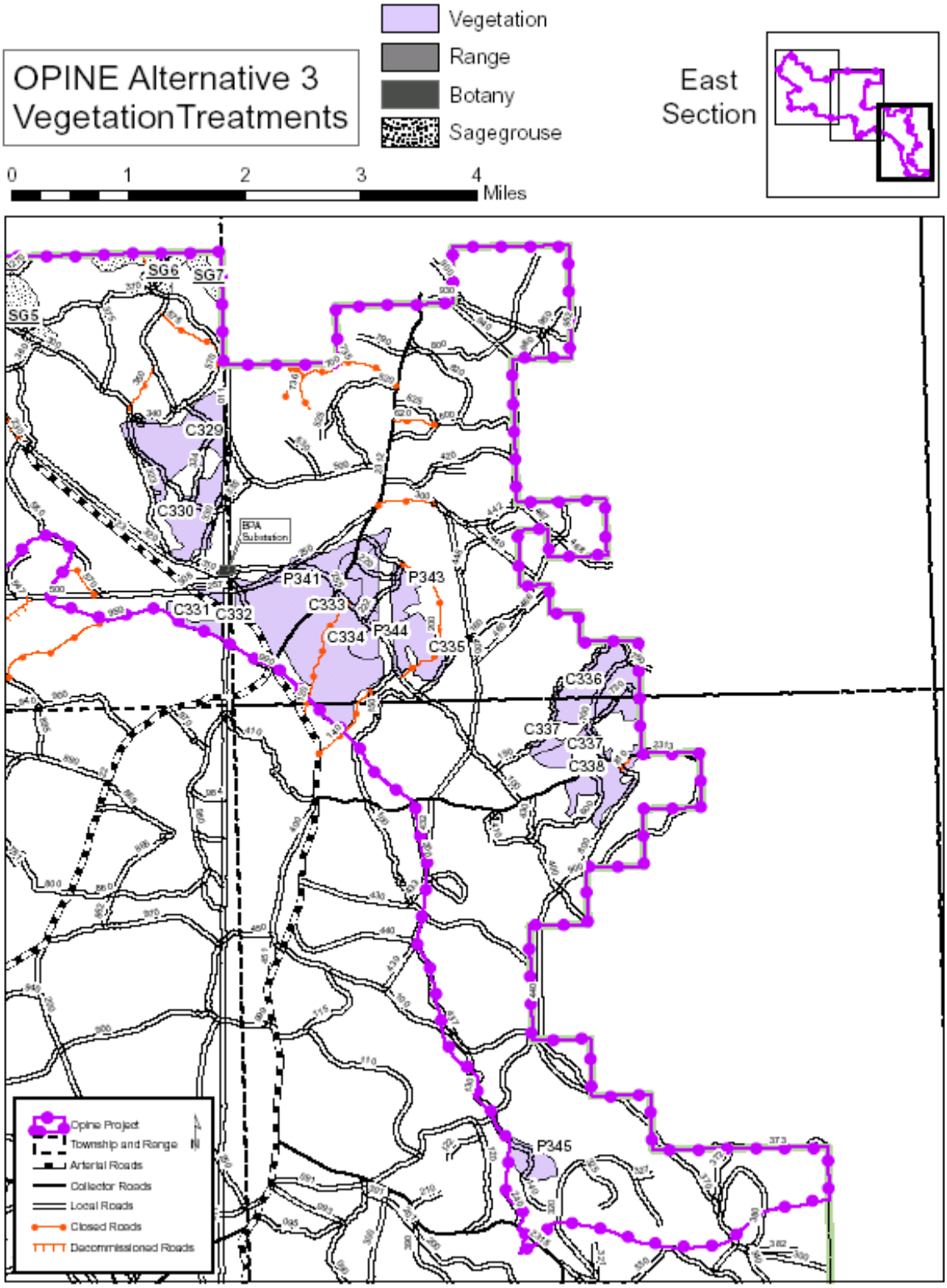
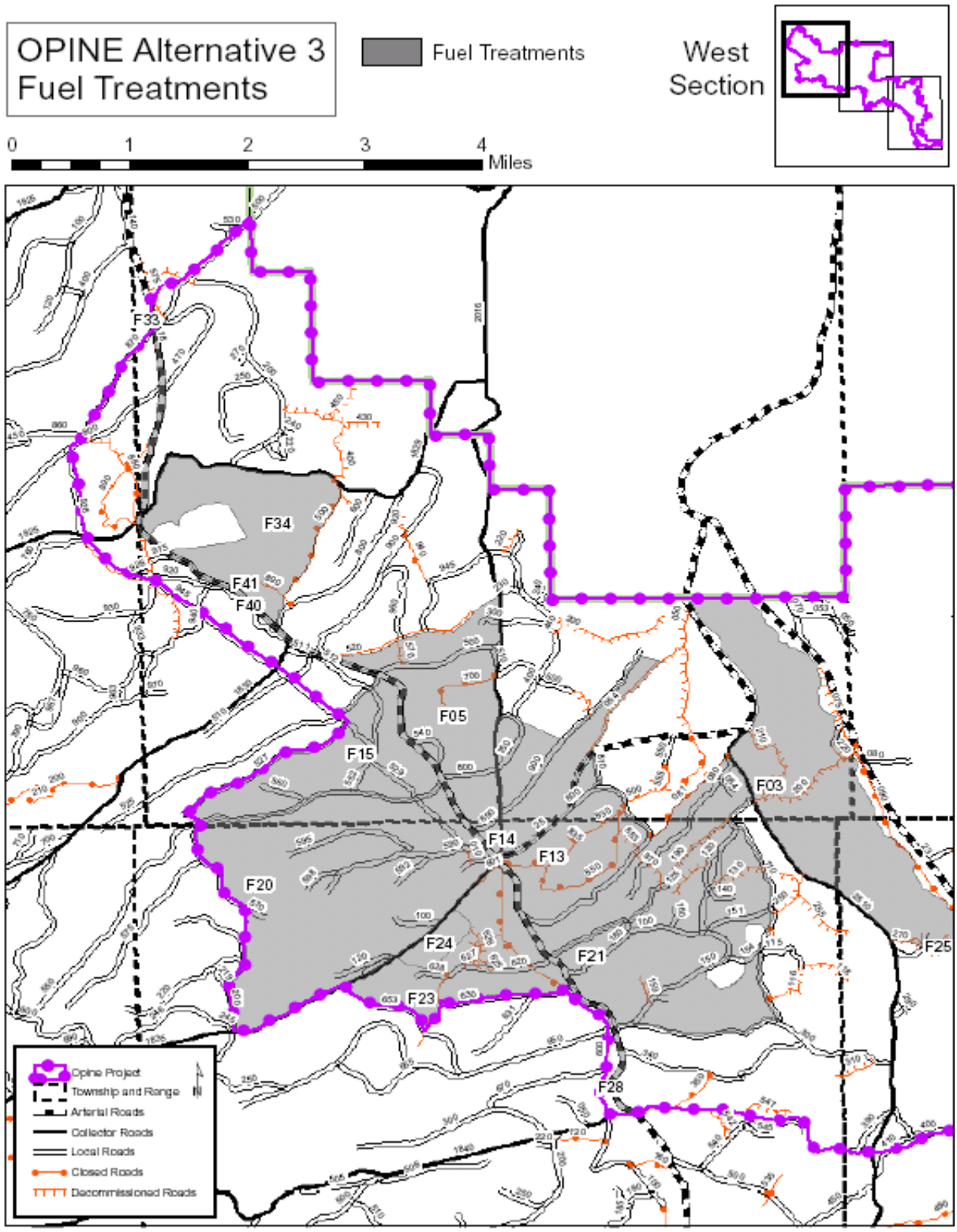


Figure 7a Alternative 3 Fuel Treatment Units – Tepee Draw.



7b Alternative 3 Fuel Treatment Units – Pine Mountain.

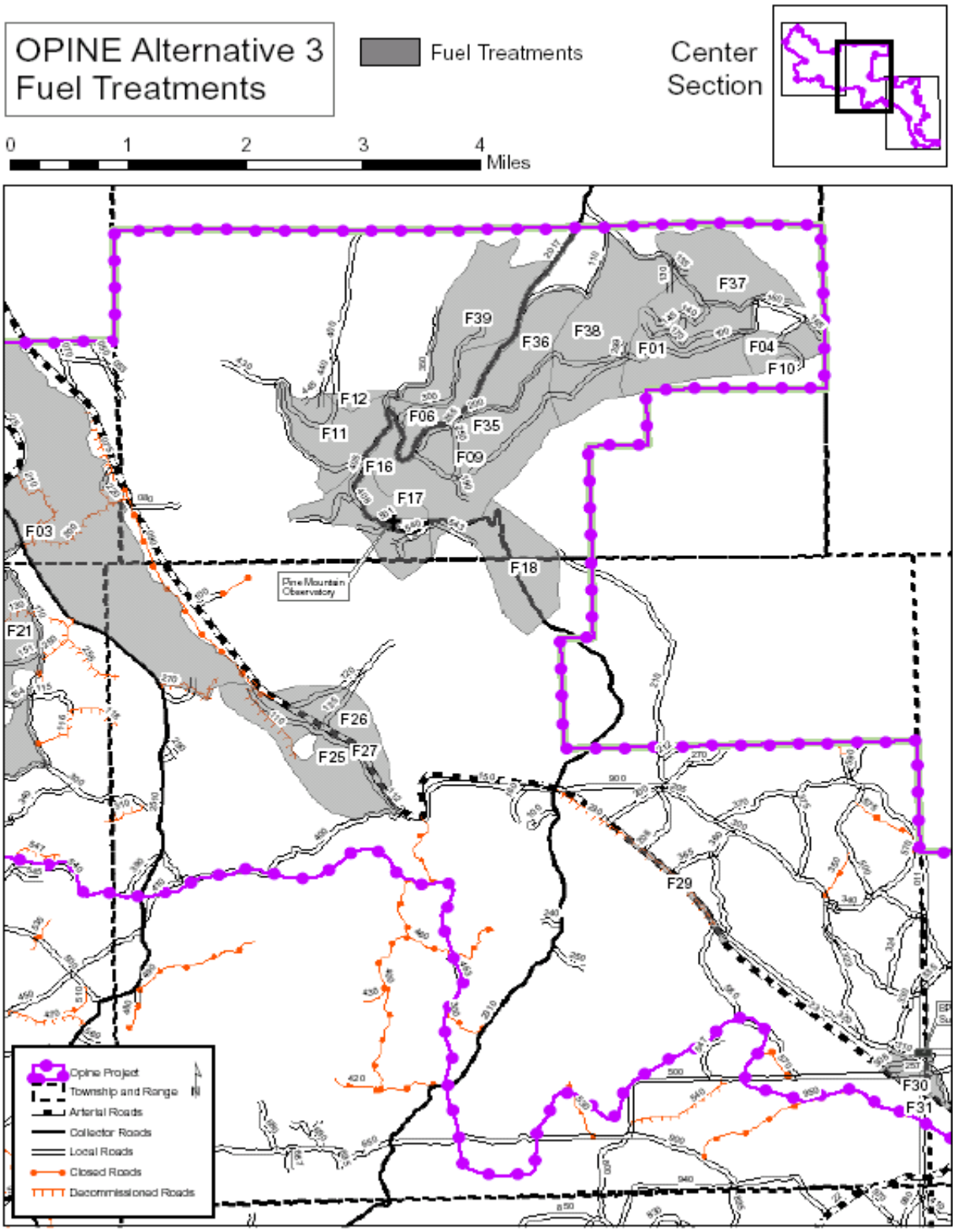
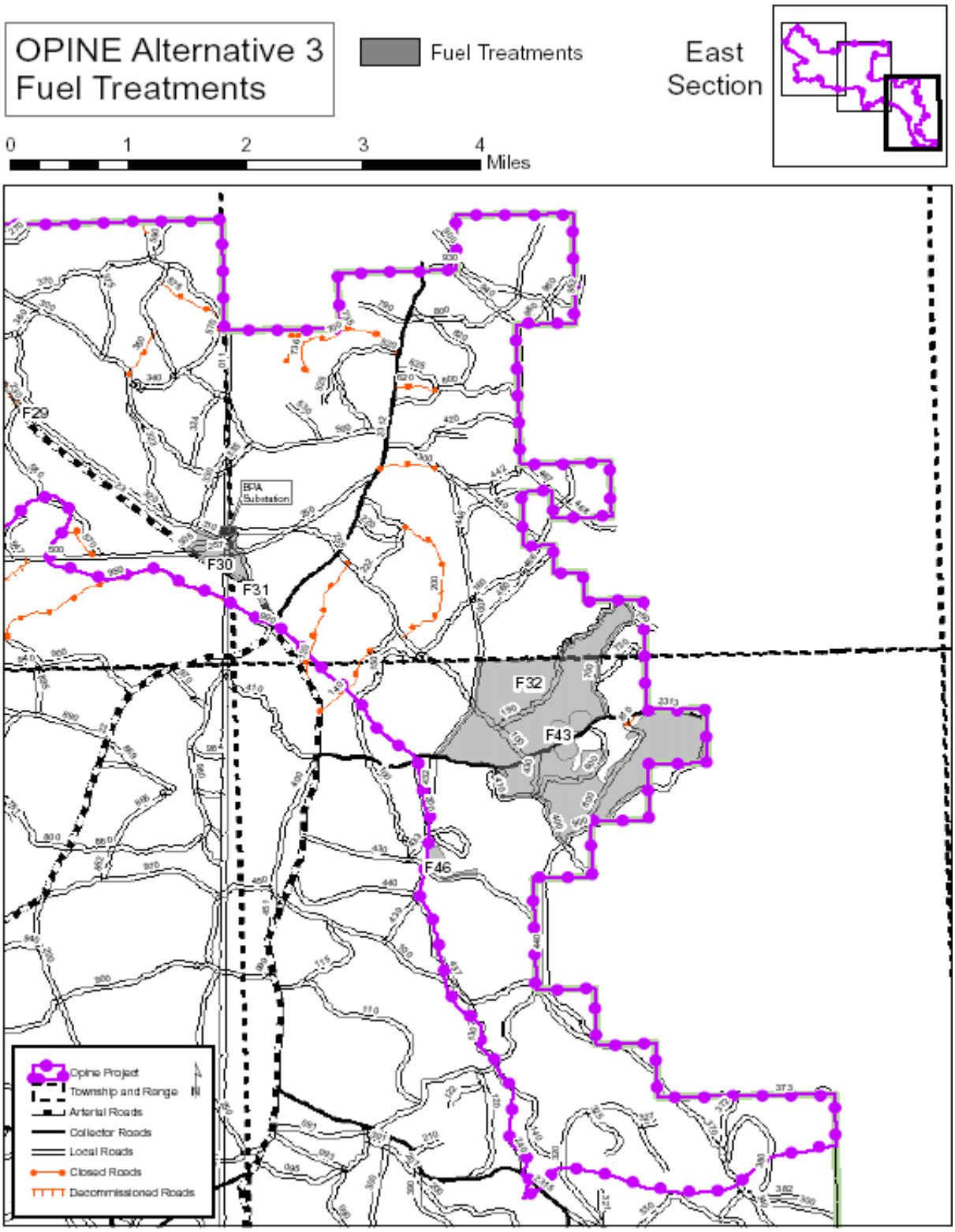


Figure 7c Alternative 3 Fuel Treatment Units – Sand Springs.



A total of 146 acres along Roads 18 and 23 would be pretreated, machine piled, and the piles burned followed by mowing of understory shrub vegetation as described under Alternative 2. No acres would be treated by the combination of pretreatment, machine piling, burning the piles, and underburning.

A total of 306 acres would be pretreated followed by mowing and underburning as described under Alternative 2.

A total of 136 acres would have fuel loadings reduced by mowing only as described under Alternative 2. A green tinged paintbrush monitoring unit (B1), one (1) acre in area, would be mowed and monitored as described in Alternative 2. The unit would not be located within any proposed fuel treatment unit.

A total of 4,352 acres would be treated using underburning only as described under Alternative 2.

A total of 2,008 acres would be treated by underburning beneath the drip line of trees only as described under Alternative 2.

Ignition of prescribe burn units would be by hand; no aerial ignition would be utilized.

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 slopes exceed 30 percent. Construction and rehabilitation would follow that described under Alternative 2.

Sixteen (16) units totaling 6,769 acres are proposed for treatment to improve or restore sage-grouse habitat by removing encroaching ponderosa pine and western juniper. All are located within historic sage-grouse habitat on Pine Mountain and are outside of proposed vegetation and/or fuels units. This includes *** acres that overlap range units 1A and 1B. All ponderosa pine less than 16 inches dbh and juniper less than 14 inches dbh would be cut and the slash lopped and scattered. Where slash concentrations exceed limits prescribed for fuel loading, slash would be hand piled and the piles either left or burned. An additional 2,605 acres of proposed range, vegetation and/or fuels treatments located within historic sage-grouse habitat would provide additional habitat. This includes 235 acres of range enhancement removing trees up to nine (9) inches dbh, 478 acres of vegetation only treatments, 786 acres of combined vegetation and fuels treatments, and 1,106 acres of fuels only treatments. Treatment prescriptions for proposed treatment units would not be changed to improve sage-grouse habitat beyond that which would be accomplished to meet vegetation and/or fuels objectives.

To reduce habitat fragmentation and mitigate the reduction of hiding and thermal cover, approximately 25 miles of existing system roads would be either closed or decommissioned (Table 7) and Figures 8a-c, pages 2-15 through 2-17). A total of 11.6 miles of roads would be closed; these roads are projected for future management needs. A total of 13.7 miles of roads would be decommissioned. This includes 2.3 miles within or adjacent to vegetation or fuel treatment units (units C338, P305, P317, P321, F29, and F40). These roads are not needed for current or future management activities.

Table 6 Proposed Road Closures and Decommissionings - Alternative 3.

Road Number	Est. No. of Miles	Proposed Status	Comments
1829250	0.99	Close	Needed for present or future mgmt.
2017130	0.31	Close	Needed for present or future mgmt.
2300206	0.66	Close	Needed for present or future mgmt.
2300324	0.73	Close	Needed for present or future mgmt.
2300330	0.37	Close	Needed for present or future mgmt.
2300375	0.80	Close	Needed for present or future mgmt.
2312150	1.46	Close	Needed for present or future mgmt.
2312155	0.13	Close	Needed for present or future mgmt.
2312160	0.71	Close	Needed for present or future mgmt.
2312200	0.45	Close	Needed for present or future mgmt.
2312220	0.13	Close	Needed for present or future mgmt.
2312250	0.88	Close	Needed for present or future mgmt.
2312257	0.83	Close	Needed for present or future mgmt.
2312444	0.31	Close	Needed for present or future mgmt.
2312500	0.46	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.
2315100	0.73	Close	Needed for present or future mgmt.
2315370	0.78	Close	Needed for present or future mgmt.
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.

Road Number	Est. No. of Miles	Proposed Status	Comments
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.
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.
2300112	1.79	Decommission	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. Convert 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. Convert to OHV trail
2300360	1.12	Decommission	Decommission from 23 Road to 2300365 junction - not needed for present or future mgmt.
2310230	1.85	Decommission	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.

Figure 8a Alternative 3 Road Closures and Decommissionings – Tepee Draw

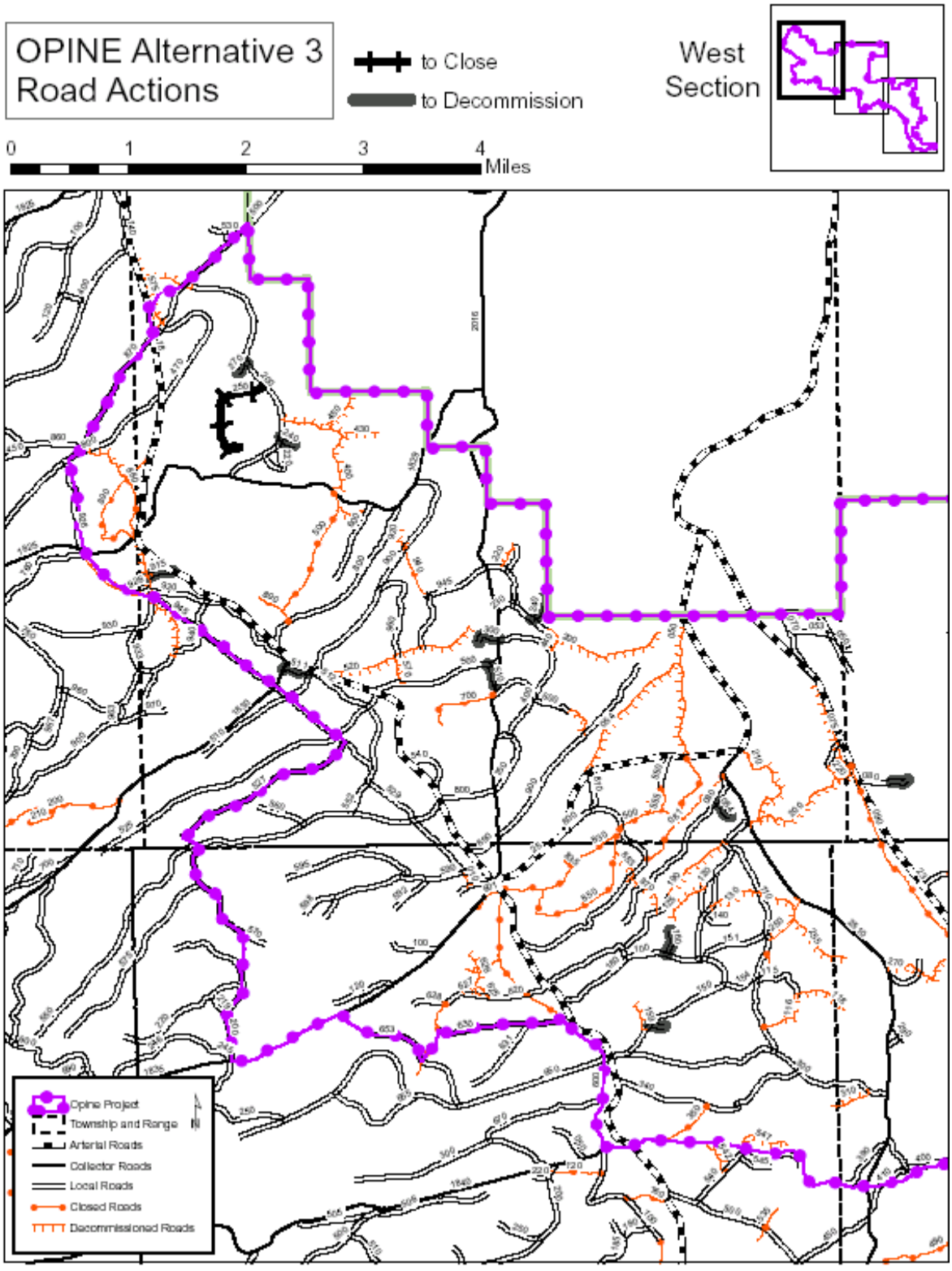


Figure 8b Alternative 3 Road Closures and Decommissionings – Pine Mountain

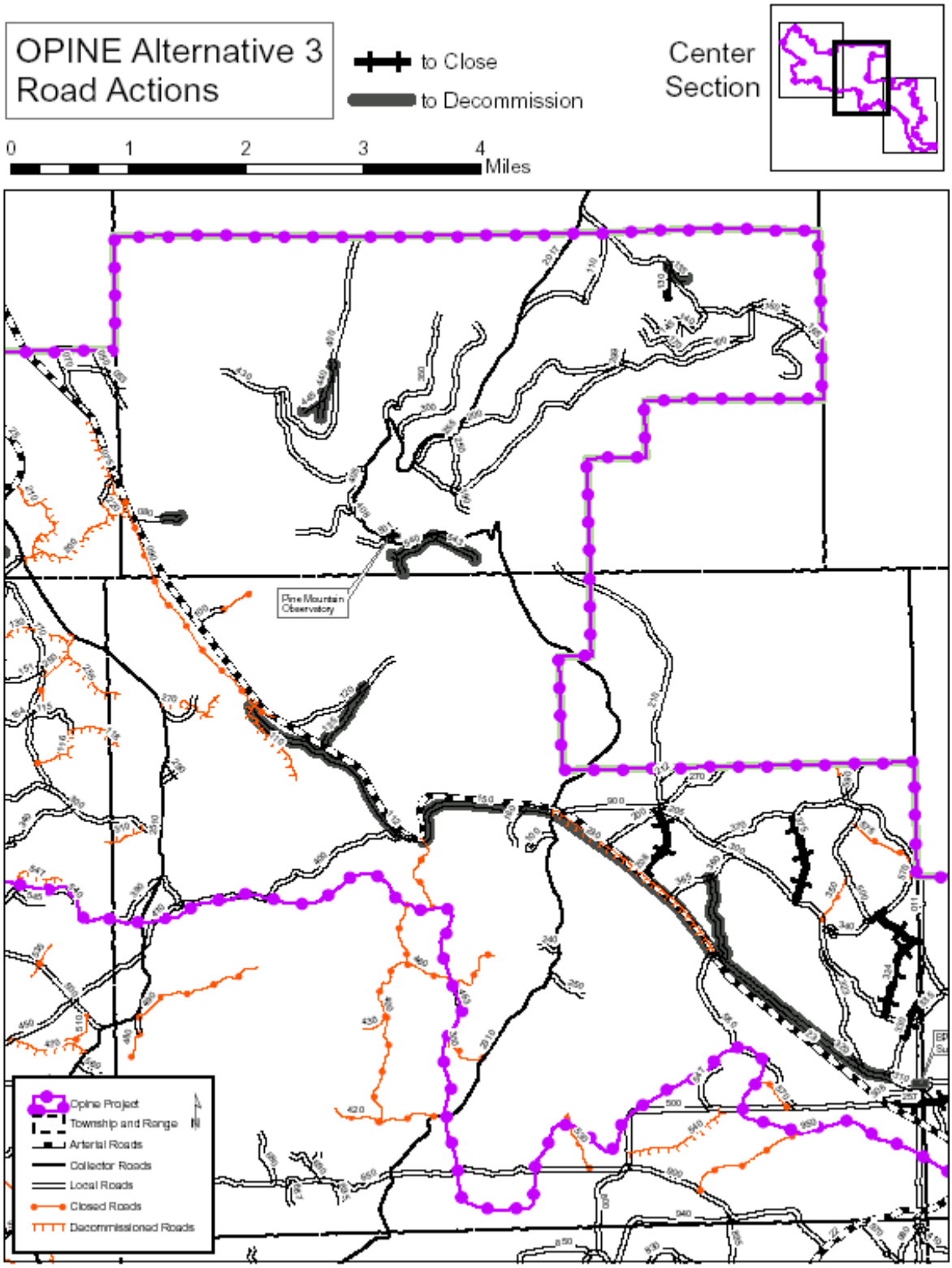
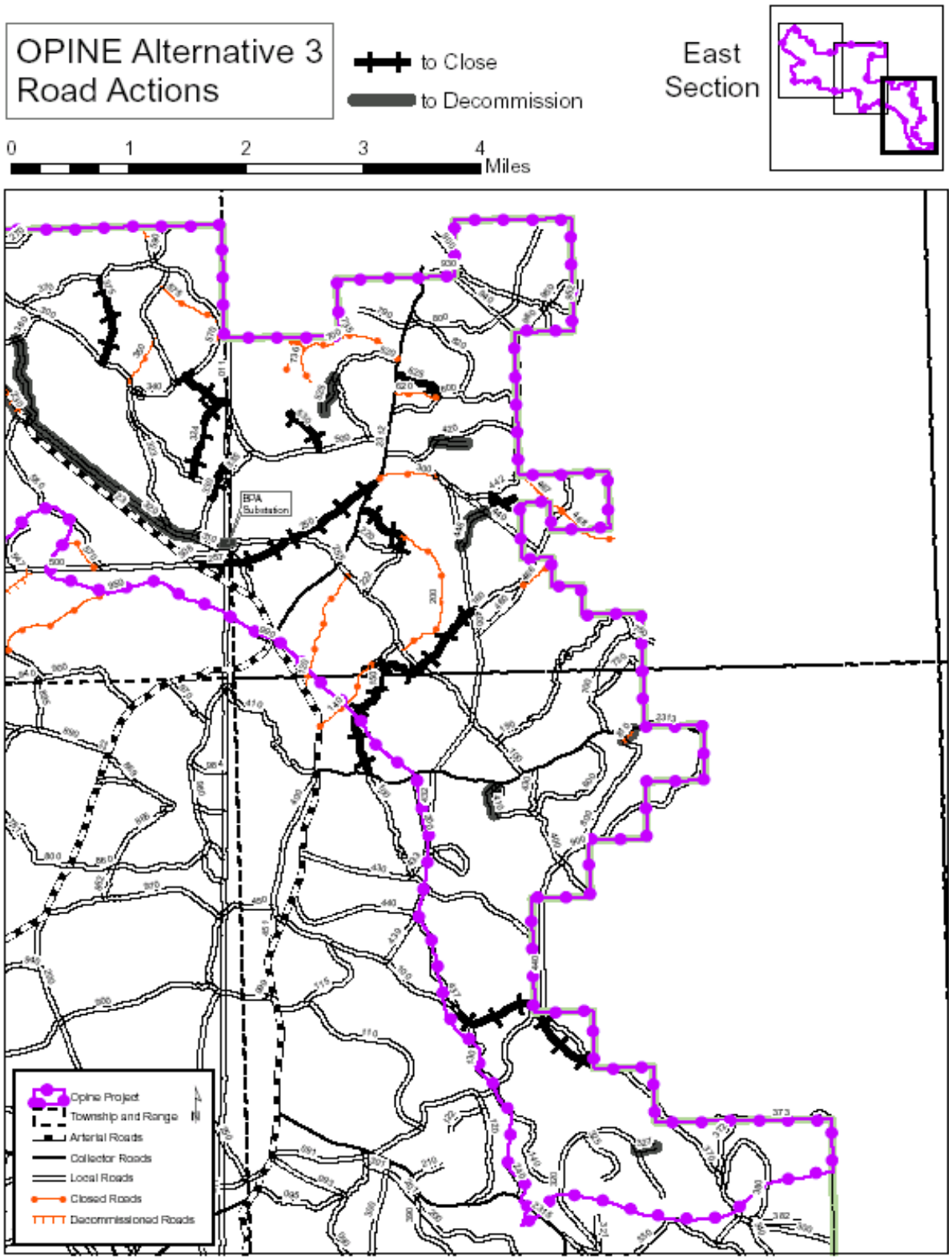


Figure 8c Alternative 3 Road Closures and Decommissionings – Sand Springs



Seasonal closures on roads and motorized trails would be implemented between December 1 and March 31 of the following year to mitigate the effects of the vegetation and fuel reduction treatments 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 be applied in both mule deer summer and winter range areas. It would not be applied to designated trails within the East Fort Rock OHV area.

All roads, except those listed in Table 7 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 7 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

To further mitigate the effects of vegetation and fuel reduction treatments on wildlife and wildlife habitat, particularly hiding and thermal cover for big game, the portion of the planning area outside of the East Fort Rock OHV area (28,647 acres) would be closed to unrestricted motorized vehicle travel. This area is located primarily east of Forest Road 23 and includes all of Pine Mountain. All motorized travel would be restricted to existing open forest system roads and designated trails. Non-street legal OHV use would follow current laws and regulations and be limited to designated routes and open maintenance level I and II forest system roads. No routes (roads or trails) would be designated under this alternative.

Road maintenance activities proposed under Alternative 2 would be the same under this alternative.

KV Projects – KV projects proposed under this alternative are the same as for the proposed action except that essential KV activities would be limited to trapping for gopher control and tubing to control animal damage for seedlings planted within the boundary of the Pine Mountain Observatory special use permit area boundary. There would be no change in proposed non-essential KV activities or their priorities.

Proposed Forest Plan Amendments

The forest plan amendments to waive the thermal cover objective in the MA-7 land allocation and to waive the hiding cover requirement in deer summer range on Pine Mountain (S&G WL-54) proposed under Alternative 2 would be included in this alternative.

COMPARISON OF THE ALTERNATIVES

Table 8 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 8 Alternative Comparison Table.

TREATMENT TYPE	ALTERNATIVE COMPARISON		
	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
ESTIMATED HARVEST VOLUME			
Gross Vol. MBF	0	5,937	6,169
Gross Vol. CCF	0	11,568	12,020
Commercial Vol. - MBF	0	5,229	5,591
Commercial Vol. - CCF	0	10,178	10,872
Non-Commercial Vol. - MBF	0	708	578
Non-Commercial Vol. - CCF	0	1,390	1,148
VEGETATION TREATMENTS			
Small & Medium Tree harvest (Trees 8-21 inches DBH)			
Commercial Harvest w/Non-Commercial Harvest	0	2,547	3,489
W/Subsoiling	0	24	44
Slash Treatment			
Lop & Scatter	0	2,329	2,407
None	0	175	138
Fuel Treatment			
Underburn	0	908	276
Burning beneath Dripline	0	632	1,887
Machine Pile & Burn	0	43	0
None	0	(135)	462
Commercial Harvest w/o Non-Commercial Harvest	0	1,620	1,257
W/Subsoiling	0	3	3
Slash Treatment			
Lop & Scatter	0	1,468	216
None	0	152	1,041
Fuel Treatment			
Underburn	0	794	253
Burning beneath Dripline	0	691	178
None	0	(783)	826
Regeneration Harvest	0	146	0
W/Subsoiling	0	22	0
Slash Treatment – Machine Pile & Burn	0	146	0
W/Planting[18]	0	49	0
W/Natural Regeneration	0	108	0
Small Tree Thinning (Trees Less than 8 inches dbh)[19]			
Non-Commercial Harvest	0	2,347	3,524
W/Subsoiling	0	10	1

[18] 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.

[19] 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.

	ALTERNATIVE COMPARISON		
Slash Treatment			
Lop & Scatter	**0**	**2,347**	**3,524**
Fuel Treatment			
W/Underburn	**0**	**2,002**	**3,286**
W/Burning beneath Dripline	**0**	**285**	**175**
None	**0**	**60**	**63**
SUBTOTAL[20]	**0**	**6,660**	**7,406**
Sage-grouse Habitat Enhancement and Range Treatments			
Sage-grouse Enhancement – Removal of Encroaching Trees[21]	**0**	**0**	**6769**
Range Enhancement	**0**	**507**	**235**
SUBTOTAL	**0**	**507**	**7,004**
FUEL REDUCTION TREATMENTS[22]			
Pretreat & Underburn	**0**	**9,553**	**9,523**
Pretreat, Machine Pile, Burn Piles, & Mow	**0**	**147**	**146**
Pretreat, Hand Pile, Burn Piles, & Underburn	**0**	**2,140**	**4,407**
Pretreat, Mow, & Underburn	**0**	**307**	**306**
Mow	**0**	**192**	**136**
Underburn	**0**	**5,260**	**4,352**
Underburn Beneath Tree Dripline	**0**	**2,064**	**2,008**
SUBTOTAL[23]	**0**	**19,663**	**17,878**
TOTAL ACRES[24]	**0**	**26,830**	**32,585**

[20] 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.

[21] This figure includes sage-grouse habitat enhancement units only and does not include acres of vegetation and fuel reduction treatments in historic habitat that would also provide shorter term improvements in sage-grouse habitat. It does include *** acres overlapping range enhancement units 1A and 1B under alternative 3 as treatments for range improvement would remove trees to nine (9) inches dbh whereas treatment for sage-grouse habitat improvement would remove juniper to 14 inches dbh and ponderosa pine to 16 inches dbh..

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

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

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

Table 9 displays the effects of every of the alternatives as measured by the measurement standards for each issue.

Table 9 Effects of Proposed Actions by Alternative.

ISSUE & MEASUREMENT STANDARD	ALT 1	ALT 2	ALT 3
WILDLIFE HABITAT			
Acres of Winter Range Treated	0	16,436	21,007
Thermal Cover Remaining After Treatment (% / acres)			
Project Area	9 / 2417	5 / 1349	2.4 / 646
WRHUs	8 / 2169	5.1 / 1324	2.2 / 582
Winter Range	6 / 1338	2.8 / 614	2.5 / 540
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
Miles of System Roads Closed or Decommissioned	0	13	25
Acres Closed to Unrestricted Off-Road Vehicle Travel	0	0	28,647
Post-Treatment Road and Motorized Trail Density			
Acres of Historic Sage-grouse Habitat Treated	0	3,289	9,374
CONDITION OF EXISTING VEGETATION			
Acres Treated Rated as Moderate/High Risk for Bark Beetle Attack	0	4,625	5,481
WILDFIRE RISK			
Acres Treated Rated as Moderate to Extreme Fire Behavior Potential	0	*****	*****

Wildlife Habitat: None of the alternatives, including Alternative 1 – No Action, would meet the LRMP standard for thermal cover of 30 percent in the deer winter range land allocation. Alternative 3 results in the greatest reduction in thermal cover of the two action alternatives. This is primarily due to the fact that more acres are targeted for treatment and more of those acres contain the highest stand densities with the greatest risk of bark beetle attack. These same acres also are the ones most likely to contain existing thermal cover.

Post-treatment hiding cover also declines under both action alternatives. Only the General Forest land allocation and the Pine Mountain sub-area contain significant amounts of deer summer range. Hiding cover prior to treatment in those areas is 37 percent, meeting the LRMP standard of 30 percent. After treatment, hiding cover would experience a major decline with neither alternative meeting the LRMP standard. Alternative 3 would retain almost twice as much cover, 319 acres versus 177 acres, as Alternative 2. Both action alternatives would leave untreated blocks within each treatment unit; 10 percent under Alternative 2 and 20 percent under Alternative 3. Current practice would retain the highest quality cover present within each unit but because the quality and distribution of existing cover is highly variable, it is unlikely that these retention patches would provide significant amounts of hiding cover in the short term under either alternative.

The reductions in cover, and particularly in thermal cover, would be at least partially mitigated by closing existing system roads. Alternative 3 closes or decommissions more miles than Alternative 2, 25 versus 13 miles thereby resulting in greater reductions in habitat fragmentation and wildlife harassment and a greater increase in habitat effectiveness. The proposed seasonal closure of roads upon completion of management activities and restriction of motorized travel to existing open system roads on 28,647 acres further mitigates the reductions in thermal and hiding cover by further increasing habitat effectiveness and reducing habitat fragmentation and wildlife harassment.

Alternative 3 has the greatest impact on wildlife and wildlife habitat. It treats the greatest number of acres within winter range; 21,007 and results in the greatest reduction in thermal cover in both acres and percentage remaining after treatment; 646 acres and 2.4 percent of the planning area respectively. Alternative 2 treats approximately 25 percent fewer acres resulting in twice as much thermal cover as measured in both acres and percentage across the planning area. However, despite the differences in treatment acres, Alternative 2 along provides 74 more acres and 0.3 percent more thermal cover within the critical winter range allocation. Neither action alternative nor the No Action Alternative (Alternative 1) meets the LRMP objective of 30 percent thermal cover within the deer winter range allocation (LRMP page 4-113).

Alternative 3 barely meets the hiding cover objective across the planning area whereas Alternative 2 does not. Neither alternative meets the objective in either the General Forest or the Pine Mountain area, the two areas within the planning area that are designated winter range. However, within 50-80 year old ponderosa pine stands where the standard requires 10 percent cover within treatment units (WL-54, LRMP page 4-58), both alternatives meet this standard with Alternative 3 providing twice the cover due to the retention of 20 percent within each treatment unit in an untreated state versus 10 percent under Alternative 2.

Alternative 3 mitigates the impacts of the vegetation and fuel reduction treatments by closing or obliterating more miles of unneeded system roads than Alternative 2; 25 versus 13 miles. It augments this by also closing the 28,647 acres outside of the East Fort Rock OHV area to motorized cross country vehicle travel and limits travel to open system roads. Finally, it institutes a seasonal closure on all roads within treatment areas upon completion of activities for the period from December 1st to March 31st. Collectively, this results in a reduction in open road and motorized trail densities to or less than the LRMP standard (M7-22, LRMP page 4-115) of 2.5 miles per square mile during the critical winter months. These actions also help to reduce habitat fragmentation, improve habitat effectiveness, and minimize harassment of wildlife. Under Alternative 2, road and motorized trail density would only marginally decline, in large part because existing user created roads and trails would not be closed and the proliferation of new trails and roads associated with unrestricted motorized use would not be abated. No changes would occur under Alternative 1. Under both Alternative 1 and Alternative 2, habitat fragmentation would continue with continuing decreases in habitat effectiveness. Harassment of wildlife would also continue to increase.

Fuels Reduction: Under Alternative 1, no acres rated as having a moderate to extreme fire behavior potential would be treated. There would be no fuel reduction treatments adjacent to the Pine Mountain Observatory. No fuel reduction treatments would be implemented on any other lands within the planning area.

Under Alternative 2, ** percent of the acres rated as moderate to extreme fire behavior potential (*****) would be treated. Thirty-six (36) percent of the planning area (19,663 acres) and 70 percent of the proposed fuels reduction acres would be treated using prescribe fire and/or mechanical treatments (mowing, pretreatment, machine piling) either singly or in combination. An additional ** percent of the planning area, and ** percent of the proposed fuels reduction acres, would have fuels reduction treatments using prescribe fire following commercial and/or non-commercial timber harvest.

Alternative 3 would treat ** percent (***** acres) of the acres rated as moderate to extreme fire behavior potential. ** percent of the planning area (***** acres) and ** percent of the proposed fuels reduction acres would be treated using prescribe fire and/or mechanical treatments, either singly or in combination. An additional ** percent of the planning area and ** percent of the proposed fuels reduction acres (**** acres), would have fuels reduction treatments using prescribe fire following commercial and/or non-commercial timber harvest.

Vegetation Treatments: Under Alternative 1, there would be no treatments of overstocked forest stands. No acres identified as moderate to high risk of bark beetle attack (10,645 acres) would be treated. No acres would be regenerated or planted to promote structural diversity and improve big game cover. No acres would be treated to reduce the area and number of juniper and ponderosa pine encroaching on historic sage-grouse habitat or reducing the quality and quantity of forage and browse available for big game or domestic livestock. No vegetation treatments would be implemented on any other forested areas within the planning area.

Alternative 2 would treat by commercial, non-commercial harvest, or a combination of the two, 6,469 acres or 18 percent of the forested acres within the planning area. Of those acres, 4,625 acres or 71 percent, are considered to be at moderate to high risk for bark beetle attack. This is 43 percent of the total forested acres considered to be a moderate to high risk for beetle attack and 13 percent of the total forested acreage within the planning area.

Alternative 3 would treat 7,703 acres or 21 percent of the forested acres. Seventy-one (71) percent of those acres (5,481 acres) are considered to be at moderate to high risk for bark beetle attack. Fifty-one (51) percent of the moderate to high-risk acres would be treated under this alternative.

Under Alternative 2, two (2) percent of the proposed harvest acres (146) and less than 0.5 percent of the forested acres would involve regeneration harvest, including 108 acres of shelterwood harvest (1.7 percent of the proposed harvest acres) and 38 acres of clearcut harvest (less than 0.1 percent of the proposed harvest acres). The 108 acres of shelterwood harvest would be regenerated using seed from the residual overstory. Forty-nine (49) acres would be planted with ponderosa pine seedlings including 11 acres of existing openings and one-quarter (0.25) acre within the Pine Mountain Observatory special use permit area.

Under Alternative 3, only one-quarter (0.25) acre would be planted within the boundaries of the Pine Mountain Observatory special use permit area. No other planting or natural seeding would occur..

Both alternatives 2 and 3 would require planted seedlings to be protected from animal damage. Both would trap gophers and require seedlings to be tubed; 49 acres under Alternative 2 and one-quarter (0.25) acre under Alternative 3.

No soil restoration would occur under Alternative 1. Fifty-nine (59) acres of landings, skid trails, and roads located within the boundaries of 11 commercial and non-commercial harvest units would be subsoiled under Alternative 2. Forty-eight (48) acres of landings, skid trails, and roads would be subsoiled in 10 commercial and non-commercial harvest units under Alternative 3.

Alternative 2 would remove encroaching juniper and ponderosa pine to enhance range conditions on 507 acres (one (1) percent of the planning area and three (3) percent of the xeric shrub type within the planning area) of xeric shrubland habitats to maintain or enhance range habitats and improve forage availability. A total of 235 acres , less than one half of one percent of the planning area and one (1) percent of the xeric shrub type, would be treated under Alternative 3. No removals of ponderosa pine or juniper would be implemented under Alternative 1.

Vegetation treatments proposed under Alternative 2 would reduce stand densities on 849 acres of historic sage-grouse habitat. Fuels reduction treatments would reduce stand densities on an additional 1,933 acres. The combination of treatments would treat 24 percent of the historic habitat within the planning area. There would be no specific sage-grouse habitat enhancement treatments under this alternative. Alternative 3 would treat 79 percent of the historic sage-grouse habitat including 1,264 acres of vegetation treatments, 1,106 acres of fuels reduction treatments, and 6,769 acres of sage-grouse habitat

restoration (tree removal in xeric shrublands). Under Alternative 1, stand densities would not be reduced on any acres within historic sage-grouse habitat. Specific sage-grouse habitat enhancement treatments would not be implemented on any acres under this alternative.

No range improvement would be implemented under Alternative 1. Alternatives 2 and 3 would reduce tree densities to maintain or improve forage and browse production on 507 and 235 acres respectively.

Access and Travel Management: Under Alternative 1, no system roads would be closed or decommissioned. Cross-country motorized vehicle travel outside of the East Fort Rock OHV area would continue to be uncontrolled. There would be no changes to OHV use within the East Fort Rock OHV area. There would be no temporary road construction.

Non-system roads and trails (user-created) would remain open to use under Alternative 2 Alternative 3 would close all non-system (user created) roads and trails to motorized vehicle travel in the planning area. Motorized travel would be restricted to designated routes (roads and trails) within the planning area. No closure would be implemented under Alternative 2. No changes to OHV use within the East Fort Rock OHV area would occur under either Alternative 2 or 3.

Alternative 2 would close or decommission 13 miles of system roads. Alternative 3 would close or decommission 25 miles of system roads. Non-street legal OHVs would continue to be allowed to use Level II system roads under both alternatives.

Alternatives 2 and 3 would construct one (1.05) mile of temporary roads to access proposed harvest units. All temporary roads would be closed and obliterated by subsoiling upon completion of management activities within harvest units.

Alternative 3 would implement a seasonal closure on system roads within the planning area during the period of December 1st to March 31st of the following year to minimize harassment of wildlife. Open road densities during this period would be at or below the LRMP standard of 1.0 to 2.5 miles per square mile. Existing designated OHV routes would not be affected by the closure. The closure would remain in effect until cover levels met LRMP standards as amended for the area. A seasonal closure would not be implemented under either Alternative 1 or 2.

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. It does not meet the purpose and need.

No other alternatives were identified as a result of scoping.

BEST MANAGEMENT PRACTICES, PROJECT DESIGN CRITERIA, AND MITIGATION MEASURES COMMON TO ALTERNATIVE 2 (PROPOSED ACTION) AND ALTERNATIVE 3

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 and INFISH Standard and Guidelines and Eastside Screens were applied in the design of the alternatives and are not listed here. The following would be applied to reduce potential adverse impacts of Alternative 2 (Proposed Action) and

Alternative 3. Where problems, concerns, or situations are encountered during project implementation not otherwise addressed, the appropriate specialist will be consulted.

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. *Moderate effectiveness.*

7. *Maintain duff layer* – Strive to maintain fine organic matter (organic materials less than 3-inches in diameter; commonly referred to as the duff layer) over at least 65 percent of an activity area (pertains to both harvesting and post-harvest operations). If the potential natural plant community (i.e., site) is not capable of producing fine organic matter over 65 percent of the area, adjust

minimum amounts to reflect potential vegetation site capabilities (LRMP SL-6; Fuels Management BMP F-2; Timber Management BMP T-13). *Moderate effectiveness*.

PROJECT DESIGN CRITERIA

Design criteria are practices, techniques, procedures, and other actions that when implemented during project layout and implementation, are expected to reduce the adverse impacts of the actions to either little or no measurable adverse impact.

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, F02, F03, F04, F05, F07, F08, F09, F10, F13, F17, F18, F21, F22, F33, F37, F38, and F39 and the following vegetation treatment units: P15, 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 to 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 out of the pumice grape fern population. The population will be flagged out prior to treatment 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, F04, F05, F10, F13, F17, F21, F33, F37, F38, and 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. 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 to 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. In sage-grouse units SG1, SG2, SG3, SG9, SG10, SG12, SG13, and SG14, all green-tinged paintbrush will be flagged out prior to implementation to prevent tree fallers from falling trees on them. Coordination will occur between the botanist and implementers.

4. In all sage-grouse units, slash will not be piled on or in close proximity to green-tinged paintbrush populations to prevent those populations from being shaded out. Slash piles will not be burned if they lie in close proximity to green-tinged paintbrush populations to protect them from being scorched or burned.

5. 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.

6. In fuel treatment unit F29, keep all treatments out of the pumice grape fern population. The population will be flagged out prior to treatment and coordination will occur between the botanist and the implementers.

7. Ensure that the treatment of fuels unit F29 does not enter the BOPU population. The population will be flagged out prior to treatment and coordination will occur between the botanist and the implementers.

Invasive Plants

1. Machinery involved 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 to the next work site.

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

4. The district botanist will identify and flag out areas of weed infestation for implementers to avoid; she/he will closely coordinate this with those doing the implementing.

5. Areas of weed infestations and other areas that will be treated for fuels will be monitored for weed invasions.

6. To avoid spreading weeds at known sites during prescribed burning staging, fuels and botany personnel will coordinate staging area choices prior to ignition, and to facilitate this, the district botanist will provide a map of weed sites for fuels personnel to use in choosing staging areas.

7. Personnel involved with the implementation of fuels treatment units will be informed/educated as to what cheatgrass looks like and how to avoid the dense patches.

8. Some small openings will be left 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 placed away from roads (where weeds commonly present themselves) where possible. Those personnel involved in implementation will coordinate this with the district botanist to ensure that there are no known weeds in those areas.

Wildlife Unit specific information is contained in Tables A-5a, A-5b, A-6, and A-7 in the Appendix of the Wildlife Report.

Big Game Cover/Forage:

BG1 - Deer hiding/thermal cover and diversity - retain 10 percent (Alt. 2) or 20 percent (Alt. 3) in untreated patches from ½ to 6+ acres in size in all units that affect 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. Emphasize thermal cover. (All vegetation and fuel treatment units)

BG2 – Deer travel 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. The 10 or 20 percent is applicable to the corridor's area within a unit's boundary, and not part of the overall unit's objective of hiding cover retention.

BG3 - Where possible, hiding cover screens will be left along open roads. Recommended for all roads within treatment units (both action alternatives) outside of the Scenic Area allocation. Where available, screens should be at least 50 feet in width

BG4 - Roads/motorized trail density within the winter range management area that are in excess of the M7-22 S&G of 1.0-2.5 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.

BG5 - In mechanical mowing units leave a minimum shrub height of 6-8 inches. Limit mowing to reducing ladder fuels under tree canopies. Do not mow in open xeric shrublands or shrub patches in treeless openings. Retain shrubs near downed logs, stumps, rocky outcrops, cliffs, and lava ecotones.

BG6 - Maintain a good distribution of shrub age classes by retaining 20-30 percent of <u>all units</u> (both action alternatives) that directly affect shrubs (e.g. mowing, burning) in untreated patches from 1/10th. to 6 acres in size with an emphasis on protecting tall, mature shrubs.

BG7 - Reduce impacts to xeric shrublands and to the mid-age structure class of bitterbrush by excluding natural fuels treatments in these areas or by the modifications of prescriptions (e.g. change broadcast burns to dripline burns).

BG8 - Avoid burning mature shrubs in the ecotone between the forest and the open ridgeline or near rocky outcrops/cliffs where natural fuel treatments are proposed on ridgelines within winter range. (Alternative 3 fuel reduction units - F01, F04, F07, F09, F11, F17, F18, F37, F38, and F39.)

BG9 - Protect all mountain mahogany patches from all treatment activities.

BG10 - Only re-treat prescribed burn/mow areas after an interdisciplinary review, including ODFW, determines that a re-burn is needed and that other resource objectives are not being compromised, e.g. regeneration of deer forage shrubs. (Alternative 3 - F02 (57% past treated), F05 (44%), F13 (42%), F14 (14%), F21 (42%), F25 (42%), F27 (40%), F35 (10%), and F36 (33%)).

BG11 - Limit the amount of annual prescribed burning treatments to meet the <u>annual</u> 2.0-2.5 percent limitation. Apply to WRHUs and refine by ecotone within each WRHU. Incorporate and account for other previously approved treatments from adjacent and overlapping planning areas, including areas on the Sisters Ranger District.

BG12 - Restrict the amount and duration of disturbance within all units in deer winter range from December 1st thru March 31st of the following year by limiting the scope and length of vegetation and fuels management activities including contract logging. Consult the District Wildlife Biologist prior to implementation in order to determine the best methods to reduce disturbance.

Non-Game Species/Habitats:

NG1 - Limit fuel treatments (i.e. mowing and prescribed burns) that may adversely affect ground nesting birdsto the periods before April 1st and after July 30th to protect ground nesting birds. Treatments that retain a mosaic of treated and untreated shrubs (reference BG6) should provide adequate protection in lieu of the seasonal restriction described.

NG2 – Use dripline burns or employ fuel breaks along the perimeter to create a mosaic of burned and unburned habitats in fuel reduction treatment units located in forested lavas. Prior to treatment, conduct surveys for the Townsend's big eared bat in those units with sinks and in adjacent cliff habitats. Determination of occupancy may limit treatment options (Alternative 3 – Unit F03).

NG3 – Apply seasonal restrictions near known or discovered raptor nests, including but not limited to the Pine Mountain goshawk and golden eagle sites (Alternative 3 - N. goshawk—P309, P315, P324, P346, F09, F17, F35, and F36. Units CT2 and F43 may be affected pending a spring goshawk survey in the area prior to any operations during the nesting season.). Restrictions will be waived if a nest is inactive.

NG4 – Retain/protect (exceptions for safety) all soft and hard snags. Provide logs and down wood 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. Retention piles should be clearly marked/signed (both alternatives, all units). Within lodgepole pine habitat types, leave where available, concentrations of down materials at the rate of one pile per acre for pine (American) marten (Alt. 3 - C327, C329, C330, C331, C333, C334, C335, P340, and P341).

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. Provide a minimum of eight (8) trees per acre 21 inches DBH or greater through time in ponderosa pine habitats and 24 trees per acre 10 inches DBH or greater in lodgepole pine habitats. The minimum required diameter in ponderosa pine habitats for retention is 12 inches dbh; emphasis is on trees 21 inches dbh and larger.

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 (both alternatives).

NG7 - Retain a minimum of 10 percent (Alt. 2) or 20 percent (Alt. 3) in untreated patches of trees from ½ to 6+ acres in size in all units (both alternatives) that 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.

Old Growth/LOS:

OG/LOS1 – Provide connectivity between LOS stands. Maintain canopy cover at a level equal to or greater than 50 percent or at the top one third of site potential. Harvest within corridors only if the minimum canopy level can be maintained.

OG/LOS2 - Protect all known LOS stands. Harvest is permissible provided that the applicable restrictions are met (Scenario A of the Eastside Screens (i.e. stage 6 and/or 7 deficit)). Manage areas outside of LOS to promote attainment of the Historic Range of Variability (HRV).

OG/LOS3 - Protect all existing trees 21 inches dbh and greater.

OG/LOS4 - Prepare management plans for Old Growth Management Areas (i.e. Pine Mountain and Pumice Springs) in need of special treatment measures.

Special/Unique Habitats:

S/U1 - Retain the larger juniper and ponderosa pine trees (generally 14-16 inches dbh or larger) in sage-grouse habitat restoration units and range betterment units with a minimum level of two trees per acre.

S/U2 - 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. Buffer width will be determined on a site-by-site basis by operations staff with the biologist, but generally it will range from 30-50 feet for rock outcrops to 300 feet for caves.

Greater sage-grouse:

SG1 - Do not conduct any vegetation or improvement projects in breeding habitats (leks and spring use areas) from February 1—June 30, nesting and early brood rearing periods. Exceptions to these restrictions may be obtained by having a biologist evaluate the site-specific situation.

SG2 - Do not use prescribed fire in occupied sage-grouse habitat (all occupied).

SG3 - Treat noxious weeds and other invasive plants (i.e. juniper, ponderosa pine, cheatgrass) aggressively by mechanical or manual means to prevent their spread and reduce the extent of their current distribution in sage-grouse habitat (all occupied). **SG4** - Do not manipulate sagebrush and its herbaceous understory within 4 miles of mapped leks being used by non-migratory sage-grouse (breeding habitats).

SG5 - Do not increase existing road densities in occupied sage-grouse habitat.

Scenic Resources and Recreation

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.

2. Clean-up activities in foreground treatment areas including landings, skid trails, and slash piles (within 300’ of Road 2017) should be completed within two years. This applies only to materials in excess of needs and requirements for coarse woody debris, snags, and to meet other resource requirements.

3. Avoid scorching above 2/3 of the live crown in prescribed burn units located within foreground treatment areas (within 300' 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. Clean up slash within recreation sites and main travel routes using a low impact machine or hand piling within 300' from the main road should be completed within two years. Retain sufficient quantities of downed logs, snags, and other materials to meet coarse woody debris, snag, and other resource requirements.

8. Minimize the amount of cut tree blue marking paint that is visible from recreation sites and main travel routes and use leave tree marking paint on the side of the tree away from the road.

9. Flush cut stumps and locate skid trails and landings within 300 feet of from Road 2017.

10. Monitoring is to be completed by a Landscape Architect within one to two years following completion of the proposed treatment and mitigation activities.

Soils

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 **). 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 (i.e., roads, landings, 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 (i.e., roads, landings, 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 (see Mitigation Measure below).

   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.

Range

1. Where rest is required after implementing fuel or vegetation treatments, develop a treatment schedule that delineates the treatment unit, pasture, allotment, and specific period of rest. The schedule would be used to minimize impacts on permittee operations.

2. Identify specific treatment objectives and the monitoring or evaluation criteria/techniques that would be used to determine if the objectives have been met and grazing can resume.

3. 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.

4. 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.

   Tables 11a and 11b display 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 50-54) and Table 6 (pages 59-63) in the Range Report.

5. Avoid existing fences in mechanical treatment units,

6. 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 funds from project funds.(timber, fire).

7. 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.

8. 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 intensity's that would alter vegetation conditions and cause exotics such as cheatgrass to invade and takeover the site.

9. Range treatment units (R1A, R1B, R2A, and R2B) will need vehicle access for implementation of proposed treatments. Some existing access roads will need to remain open or be maintained during treatment.

   a. 1829-200 – Maintain road prior to implementation

   b. 2300-125 - Plan treatment / livestock use a separate times.

Table 10a Alternative 2 Design Criteria and Improvement Protection Requirements for Range Improvements associated with Proposed Vegetation and Fuel Treatments.

Treatment	Improvement Type	Design Criteria	Units
Vegetation	Barbed Wire Fence		SD03, SD04, SD05, P09, P10, P14, P15, P16, P22, H01, H10, H11, H12, H22, H24, H25, H38, H39, H40.
	Water Set	Potential cheatgrass site - avoid use during active grazing Leave 25 foot buffer when cheatgrass is present.	SD08, P15, H14, H27, H28.
	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.
	Trick Tank	300 foot buffer around site; clean up all slash	P02
	Water Storage Tank		H25.
	Tree Plantation	Protect with "hard" fencing, new improvement construction.	H19, H23
Fuels	Barbed Wire Fence	Unit R1B – mow lower slopes, burn steeper, upper slopes.	F03, F04, F05, F06, F08, 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
	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.	F05, F20, F23, 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
	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
	Trick Tank	300 foot buffer around site; clean up all slash	F01
	Water Trough	Waterline to be added; subsurface.	F32

Table 10b Alternative 3 Design Criteria and Improvement Protection Requirements for Range Improvements associated with Proposed Vegetation and Fuel Treatments..

Treatment	Improvement Type	Design Criteria	Units
Vegetation	Barbed Wire Fence	Unit R1B – mow lower slopes, burn steeper, upper slopes.	P301, P317, P321, P327, P328, P330, P331, P333, P335, P337, P345, C307, C309, C320, C321. C322. C326, C336, C337,
	Water Set	Potential cheatgrass site - avoid use during active grazing Leave 25 foot buffer when cheatgrass is present.	P333, P334, C325, C327,
	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.	P330, C307, C320, C334,
	Trick Tank	300 foot buffer around site; clean up all slash	P302
	Water Storage Tank		C320
	Tree Plantation	Protect with "hard" fencing, new improvement construction.	C314, C319
Fuel	Barbed Wire Fence	Unit R1B – mow lower slopes, burn steeper, upper slopes.	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
	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.	F20, F23, F37, 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	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
	Trick Tank	300 foot buffer around site; clean up all slash	F01
	Water Trough	Waterline to be added; subsurface.	F32

10. 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 7 lists specific roads that need additional mitigations.

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" 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, primarily on Pine Mountain, 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 (Units C323 and C324 in Camp II Trailhead) (both alternatives).

11. Do not implement fuel treatments within the Road 25 staging area (unit F13) or the Camp II Trailhead (unit F23). 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 P319 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 *** feet of trails, fences, barriers, fences or other structures and *** feet of trailheads or staging areas. For trees or logs located within ** feet of trails, staging areas, or trailheads, require trees/logs to be skidded to the skidder by pulling bull line (no driving up to the tree/log).

13. Require equipment to cross trails at right angles. Minimize the number of crossings with no crossings closer than **** 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 ** hours of completion of operations. For non-commercial operations, removal would be within 24 hours after creation.

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

16. Block all skid trails and firelines that intersect with designated trails and shared use roads. Use slash materials and other local, natural forest material – logs, rocks, brush, etc. – that was disturbed/displaced during operations.

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

18. Do not use designated OHV trails as firelines or boundaries for mowing and/or burning units.

19. 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 ** 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.

Special Uses

1. 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 opera tings.

MITIGATION MEASURES

Mitigation measures are practices, techniques, procedures, and other actions that when implemented after project completion, are expected to reduce the adverse impacts of the actions to either little or no measurable adverse impact when compared to existing or current conditions. They are implemented to correct or minimize adverse impacts that cannot be completely mitigated through BMPs or design criteria.

Soils

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 (firelines).

Alternative 2 - Reclaim logging facilities in portions of the following 12 activity areas which are expected to exceed allowable limits of detrimental soil conditions following mechanical treatments.

1. Units - H02, H07, H10, H19, H23, H28, 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 13 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, C338, C339, P304, P317 and P321.

2. Decommissioning (subsoiling) of local system roads - Units C338 (0.1 miles), 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, F18, F38 and F39.

Wildlife

Alternative 2

To mitigate the effects of vegetation and fuel reduction treatments on mule deer hiding, and thermal cover, close and/or decommission approximately 13 miles of existing system roads (close approximately 3.1 miles; decommission approximately 9.7 miles).

Alternative 3

To mitigate the effects of vegetation and fuel reduction treatments on mule deer, hiding, and thermal cover:

1. Close and/or decommission approximately 25 miles of existing system roads (close approximately 11.7 miles; decommission approximately 13.6 miles); and

2. Implement an area closure order on the 28,647 acres of the planning area outside of the East Fort Rock OHV area to restrict motorized use to designated system roads and trails. Non-street legal OHVs would be restricted to open maintenance level 1 and 2 roads or other designated shared use roads. Cross country travel by all motorized vehicles would be prohibited. All user created roads and trails would be closed.

3. 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.

Chapter 3 - AFFECTED ENVIRONMENT & 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.

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

Alternative 1, No Action, is discussed first. It provides the reference point for describing the environmental consequences of all the other alternatives. The discussion of Alternative 2, Proposed Action, and Alternative 3 follow.

Issue-Related Consequences

Issue 1 - Wildlife Habitat

Direct and Indirect Effects

Measurement Standards

1) **Acres of deer winter range habitat treated by vegetation and/or fuels treatments.**

No treatments would be implemented in deer winter range under Alternative 1.

Alternative 2 treats 16,436 acres including 1,807 acres of vegetation only treatments (commercial and non-commercial harvest; 2,517 acres of a combination of vegetation and fuel reduction treatments; 11,848 acres of fuel reduction only treatments; 197 acres of range enhancement treatments, and eight (8) acres of fuel reduction treatments associated with studying the effect of mowing on green tinged paintbrush.

Alternative 3 treats 21,007 acres including 2,396 acres of vegetation only treatments (commercial and non-commercial harvest; 2,226 acres of a combination of vegetation and fuel reduction treatments; 9,304 acres of fuel reduction only treatments; 197 acres of range enhancement treatments, one (1) acre of fuel reduction treatments associated with studying the effect of mowing on green tinged paintbrush, and 6,958 acres of sage-grouse habitat enhancement treatment.

2) Percentage hiding and thermal cover after treatment.

Table 11 displays the effects of vegetation and fuel reduction treatments on the acres of thermal cover present in the planning area by alternative. Thermal cover acres only include optimal and acceptable cover; i.e. stands that contain canopy closures of 31 percent or greater.

There would be no change in the acreage or percent of thermal cover in the planning area under Alternative 1. Alternative 2 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 the project area would decline to 1,349 acres or five (5) percent of the planning area. Within WRHUs, thermal cover would encompass 1,324 acres or 5.1 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 would result in the removal of approximately the same number of acres as Alternative 2, 1,773 versus 1,727 acres but results in fewer acres and lower percentages of acceptable and optimal thermal cover. Cover levels would decline to 646 acres or 2.4 percent of the project area; 582 acres or 2.2 percent of the WHRU acres; and 540 acres or 2.5 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.

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 habitat has the greatest percentage decline under both alternatives; 88 percent under Alternative 2 and 68 percent under Alternative 3; the effects on wintering mule deer under normal conditions would likely not be measurable because the areas would be inaccessible to deer..

In the longer 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. Such growth also means that 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 for multiple decades as evidence by the fact that large areas of the 1959 Aspen Flats fire remain devoid of thermal cover to this day. 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 likely take several decades. Without planting, recovery of thermal cover to meet current definitions would likely take multiple decades depending upon the severity and intensity of the fire.

Table 12 (page 3-4) displays the effect of proposed vegetation and fuel reduction treatments on the levels of hiding cover with the general forest land allocation and the five WRHU areas for Alternatives 2 and 3.

Table 11 Effects of Vegetation and Fuel Reduction Treatments on Thermal Cover, Alternatives 2 and 3, Opine Planning Area (modified from Tables 19 and 20, Wildlife Report, pages 23 and 24).

WRHU or LRMP Allocation	Current Thermal Cover (Alt 1)		Post-Treatment Cover Reductions				Forested Habitats (Ac Potential Thermal Cover)		Post-Treatment Thermal Cover (Pct Forested Habitats/Pct desired condition 30% in WRHUs)	
			Optimal		Acceptable					
	Acres of Optimal	Acres of Acceptable	Alt 2	Alt 3	Alt 2	Alt 3	Alt 2	Alt 3	Alt 2	Alt 3
General Forest	5	243	-4	-4	-219	-180	782	782	25/3%	64/8%
Lavacicle	0	297	0	0	-219	-224	1465	1465	78/5%	73/5%
Mahogany	35	430	-28	-28	-133	-133	5912	5912	304/5%	305/5%
Pine Mountain (winter + summer range)	421	523	-400	-415	-345	-436	5077	5077	199/4%	94/2%
Pine Mountain (winter range only)	0	113	0	0	-2	-61	1123	1123	111/10%	52/5%
Potholes	5	105	-5	-5	-53	-49	5580	5592	52/1%	56/1%
TePee Draw	19	334	-19	-19	-302	-280	7734	7734	691/9%	54/<1%
Totals:	485	1932	-456	-471	-1271	-1302	26550	26550	1349/5%	646/2.4%
WRHU							25768	25768	1324/5.1%	582/2.2%
Winter Range Only							21814	21814	614/2.8%	540/2.5%

Note: Treatment effects assumptions-- Vegetation thinning treatments include MTT/ STT prescriptions and Fuel treatments with pre-treatment understory thinning. It is assumed based upon modeling runs that any MTT or STT thinnings will reduce canopy cover to less than 30 percent, which renders it as non-thermal cover. It is also assumed that fuels pre-treatment understory thinnings will degrade thermal cover by eliminating a portion of the canopy that can benefit deer (i.e. trees greater than 5 feet in height). This effect is quantified as a reduction of 10 percent canopy cover (modeling runs suggest 2-3 percent). Therefore, the reductions are applied to the respective thermal cover categories (i.e. optimal and acceptable) and those acreage reduced to the marginal or non-cover categories are displayed as "post-treatment cover reductions." Mitigation of effects of thinning (i.e. 10 percent retention patches under Alternative 2 and 20 percent under Alternative 3) is not reflected in the above analysis, because the clumps are to be distributed across individual units for a variety of objectives (e.g. hiding cover, vertical diversity, etc.) and cannot be assumed to provide thermal cover exclusively

Table 12 Effects of Vegetation and Fuel Reduction Treatments on Hiding Cover by Alternative, Land Allocation, and WRHU, Opine Planning Area (modified from Tables 16b & 17b, Wildlife Report, pages 21 & 23).

Sub-Area	Existing Hiding Cover(Ac)	Treatment Reduction (Ac.)		Post-Treatment Hiding Cover (Ac.)		Pct Residual Hiding (Current Pct Cover)	
		Alt 2	Alt 3	Alt 2	Alt 3	Alt 2	Alt 3
General Forest (summer range)	337	-335	-440	2	53	< 1 (43)	**6.7 (43)**
Lavacicle WRHU	543	-490	-311	53	103	3.6 (37)	**7.0 (37)**
Mahogany WRHU	1812	-305	-1193	1507	1501	25 (31)	**25.3 (31)**
Pine Mountain WRHU	1642	-1239	-395	403	449	7.7 (29)*	**8.6 (29)**
Potholes WRHU	848	-475	-431	373	453	6.7 (15)	**8.1 (15)**
TePee Draw WRHU	563	-511	-3054	52	132	<1 (7)	**1.7 (7)**
Totals	**5745**	**-3355**	**-440**	**2390**	**2691**	**8.9 (21)**	**10.1 (21)**

Note: *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. *Pine Mountain includes both winter and summer range.*

Alternative 2 would reduce hiding cover across the planning area from 5,745 acres to 2,232 acres, a reduction of 3,395 acres or 60 percent. This would drop hiding cover from the current 11 percent of the planning area acres to 4.1 percent. Considering only those acres capable of providing cover, i.e. the forested acreage, the level of cover drops from the current 21 percent to 8.9 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. However, in summer range areas, the standard for hiding cover within treatment units in black bark pine stands is 10 percent. Treatment units would meet this cover standard because 10 percent of the treatment units would be retained as untreated patches within the treatment unit boundaries.

Alternative 3 reduces current cover levels by 3,054 acres or 54 percent, to 2,573 acres. After treatment, 4.7 percent of the planning area acres and 10.1 percent for suitable or potential habitat acres 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.

Post-treatment hiding cover across the planning area is either slightly below or barely meets the LRMP objective for cover in winter range (10 percent) but is highly variable between sub-areas.

There is an approximately 0.5 percent difference in the calculated cover percent when comparing the project-wide analysis to the sub-area analysis with the sub-area analysis showing a higher cover figure,

e.g. 8.4 versus 8.9 percent under Alternative 2 and 9.6 versus 10.1 percent under Alternative 3. This is likely due to differences in the GIS polygons associated with each analysis.

Alternatives 2 and 3 have a lower risk of a bark beetle epidemic, especially in treated stands because conditions in those stands do 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 thermal cover levels are low, and far below LRMP objectives, the likelihood of that cover being lost to insect attack or wildfire is greatly reduced for the next several decades.

3) Bitterbrush Age/Structure Ratio

Table 13 displays the acreage and percentage of bitterbrush by age class and structure under each of the alternatives. 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 13 Bitterbrush Age Class/Structure by Alternative (Adapted from Table 7, page 9; Table 22, page 26; and Table 23, page 27, Wildlife Report).

Age Class / Structure Stage	Alt 1 (Acres/Percent)	Alt 2 (Acres/Percent)	Alt3 (Acres/Percent)
Early	12,734 / 26	22,922 / 46	22,145 / 45
Mid	4,871 / 10	2,279 / 5	2,589 / 5
Late	15,387 / 31	11,668 / 24	12,072 / 24
Decadent	16,633 / 34	12754 / 26	12,819 / 26

Under Alternative1, 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 1/3rd 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 1/3rd of the acres in each seral stage.

With the exception of the early seral stage, Alternatives 2 and 3 result in the almost the same percent of bitterbrush in both the mid and late seral stages; five (5) and 50 percent respectively. Alternative 3 retains marginally more acres in each of those stages but the difference in not significant. Alternative 3 also results in fewer acres moving into the early seral stage, resulting in one (1) percent less early seral habitat than Alternative 2; 45 versus 46 percent. However, both alternatives result in the early seral stage now exceeding the desired goal of 1/3rd of the acres in this seral stage by more than 1/3rd. The late seral stage declines from 65 percent of the bitterbrush acres to 50 percent, a reduction of 23 percent but remains above the desired level.

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. Alternative 3 retains a greater percentage of bitterbrush acres in the late and mid seral stages in the Tepee Draw area, 51 and seven (7) percent respectively, versus the 47 percent and four (4) 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; 43 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 (Tables 22 and 23, pages 26 and 27, Wildlife Report).

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 serious 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.

The higher than desired percentage of bitterbrush in the late seral stage is expected to mitigate at least some of these impacts. Deer will 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.

4) **Miles of system roads closed and decommissioned; and**

5) **Road and motorized trail densities.**

Alternative 1 would close or decommission no existing system roads. Alternative 2 would close or decommission 13 miles of system roads. This would include the closing of 3.1 miles and decommissioning 9.2 miles. Alternative 3 would close or decommission 25 miles including the closure of 11.6 miles and the decommissioning of 13.7 miles

Under Alternative 1, current road and motorized trail densities, including both system and user created roads and trails, would remain at an average of 4.96 miles per square mile across the planning area with a range from 2.43 miles per square mile in the Pine Mountain WRHU to 7.90 miles per square mile in the Potholes WRHU. System road densities would remain at ** miles per square mile and system motorized trails at ** miles per square mile. The best available information regarding the number and mileage of user created roads and trails suggests that they would be ** miles per square mile, a figure that is conservative.

During hunting season, a seasonal road closure (Green Dot system) reduces the mileage of both system roads and user created 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.

Under Alternative 2, road densities would decline to *** miles per square mile due to the closure and obliteration of 13 miles of system roads. This would also result in a decrease in the density of system roads and system trails to *** miles per square mile. No changes in the number of miles of user created roads and trails would occur because no area closures or other travel restrictions would be implemented.

Overall, road and motorized trail density, including both system and user created roads and trails, would decline to *** miles per square mile.

Under Alternative 3, the closure or obliteration of 25 miles of system roads would reduce system road densities to *** miles per square mile. No system motorized trails would be closed. Road and motorized trail density associated with system roads and trails would drop to *** miles per square mile. Closing the portion of the planning area outside of the East Fort Rock OHV area to unrestricted cross country motorized travel would close all user created roads and trails to motorized use. Road and motorized trail densities would decline from the current *** miles per square mile that includes both system and non-system roads and trails to *** miles per square that includes only system roads and trails.

Road densities would be further reduced under Alternative 3 by an additional seasonal closure from December 1st to March 31st of the following year. This closure would be imposed on vegetation and fuel treatment areas upon completion of management activities and would serve to mitigate the effects of the treatments on hiding and thermal cover. When fully implemented in 10-15 years, road and motorized trail densities would decline to *** miles per square mile.

Alternative 3, because of the number of miles of system roads closed or obliterated, the application of seasonal closures, and the closure of the area outside of the East Fort Rock OHV area, results in the greatest reduction in road and motorized trail density. 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. Although 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.

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 user created 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.

6) Acres closed to unrestricted OHV use.

Neither Alternative 1 nor Alternative 2 would restrict motorized off-road vehicle use anywhere in the planning area outside of the East Fort Rock OHV area. Habitat would continue to be fragmented and harassment of wildlife would continue and potentially increase with increasing OHV activity. Alternative 3 would close 28,647 acres to unrestricted motorized off-road vehicle use outside of the East Fork Rock OHV area. Legal use would continue on designated roads and trails including the use of non-street legal OHVs on level II roads. Prohibition of cross-country motorized travel use and the closure of user-created trails would decrease habitat fragmentation and reduce the amount and intensity of harassment associated with motorized vehicle use.

7) Acres of historic sage-grouse habitat treated to reduce tree encroachment and stocking levels.

Under Alternative 1, no acres of historic sage-grouse habitat would be treated. Under Alternative 2, 3,289 acres of historic habitat would be treated by vegetation, fuel reduction, or range enhancement treatments.

Prescriptions would not be modified to meet objectives beyond those identified to meet vegetation, fuel reduction, or range enhancement treatments. No habitat enhancement treatments are proposed in xeric shrublands to reduce encroaching ponderosa pine and juniper. Under Alternative 3, 2,605 acres of historic habitat would be treated under vegetation, fuel reduction, or range enhancement treatments. Prescriptions would not be modified to meet objectives beyond those identified to meet vegetation, fuel reduction, or range enhancement treatments. This alternative would remove encroaching ponderosa pine and juniper on an additional 6,769 acres of historic habitat.

Additional Effects

Thermal Cover – As noted above, 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.

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. However, these same acres are also rated as moderate to high risk for bark beetle attack. Over the long term, more than a decade, such an infestation would likely result in the reduction or complete loss of existing thermal cover from many if not all of the acres. This suggests that it is unlikely that many of the forested areas in the planning area are biologically incapable of sustaining thermal cover objectives specified in the LRMP for the deer winter range land allocation (MA-7). This is supported by research that suggests that ponderosa pine in stands with site indices of less than 90 are not capable of providing dispersal habitat (stands with an average dbh of six (6) inches and a canopy cover of at least 25 percent on a sustained basis (Silviculture Report, Appendix D Silvicultural Specialist Letters, page 53). 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).

Similarly, 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 and hiding cover and bitterbrush browse for mule deer. Large areas within the 1959 Aspen Flats Fire continue to lack suitable thermal and hiding cover 45 years later. A wildfire ignited today is more likely to be of a higher intensity due to greater fuel loadings. Impacts to soils and vegetation can reasonably be assumed to be greater suggesting that recovery time for hiding cover may require a century or more and multiple centuries for thermal cover. Bitterbrush recovery would also be expected to take several decades or longer, depending upon the severity of the burn.

Alternatives 2 and 3 would result in a decline in thermal cover from nine (9) percent of the acres across the entire planning area to five (5) and 2.4 percent of respectively. Within WRHUs, the decline would be from the current eight (8) percent average to 4.9 and 2.2 percent respectively. 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.

The risk of bark beetle attack and the subsequent long term loss of cover, particularly thermal cover, would be greatly reduced on treated acres. However, 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 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.

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 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. However, only the General Forest land allocation (MA-8) and the Pine Mountain area contain significant amounts of deer summer range. Within black bark ponderosa pine stands, the cover standard is 10 percent. Cover quality in ponderosa pine stands is generally low. It is in better condition in lodgepole pine stands that 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. Under Alternative 1, there would likely be no measurable short term change (less than 15 years) in hiding cover quality, quantity, or distribution. 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. Increases, should they occur, would be more likely to be measurable after 10 years or more.

Long term, and assuming no disturbance such as a wildfire or insect infestation, the quality, quantity, and distribution of hiding cover would be expected to increase across the planning area., However, the quality of hiding cover in some ponderosa pine stands would be expected to decline as crowns rise and lower branches self-prune thereby increasing sight distances. This loss may at least be partially offset by shrub growth and tree mortality associated with inter-tree competition and mortality associated with insect attack or disease agents. Dead and fallen trees would provide additional screening thereby maintaining or improving hiding cover. Shrubs such as manzanita and snowbrush that can attain heights of five or six feet are currently young and small in height. In some areas, the growth of these species could provide hiding cover when they reach such heights.

It is impossible to determine when an insect attack or wildfire would impact a specific acre. However, 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.

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 small 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 two areas that contain significant amounts of deer summer range, general forest (MA-8) and Pine Mountain, both alternatives would result in large reductions in existing cover levels. Table 14 displays the effects of the proposed treatments in the general forest allocation and the Pine Mountain sub-area under Alternatives 2 and 3.

Table 14 Effects of Vegetation and Fuel Reduction Treatments on Hiding Cover in Deer Summer Range - General Forest and Pine Mountain Sub-Areas, Opine Planning Area (from Table 18, Wildlife Report, page 23).

Sub-Area	Current Cover	Fuels Treatment Effects*		Vegetation Treatment Effects*		Post-Treatment Cover	
		Alt. 2	Alt. 3	Alt. 2	Alt. 3	Alt. 2	Alt. 3
Pine Mountain (4042 forested ac.)	1445 ac. (36% of forested/potential cover)	-240 ac.	- 130 ac.	-1030 ac.	-1049 ac.	175 ac. (4%)	266 ac. (7%)
General Forest (782 forested ac.)	337 ac. (43%)	w/veg	w/veg	-335 ac.	-284 ac.	2 (<1%)	53 ac. (7%)
Totals: 4824 forested ac.	1782 ac. (37%)					177 (3.6%)	319 (6.6%)

***Note**: *Retention patches included (10 percent for Alt. 2 and 20 percent for Alt. 3).*

The LRMP requires 30 percent hiding cover in summer range (LRMP S&G WL-54, page 4-58) except for those areas classified as black-bark ponderosa pine where the requirement is to retain 10 percent hiding cover *within each treated stand* (LRMP S&G WL-59, page 4-59). This latter standard is applicable only to the general forest sub-area which is dominated by black bark stands.

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. Alternative 3 retains more cover in both areas. 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. Combined cover for the two areas, currently at 1,782 acres or 37 percent of the forested area, would decline to 177 acres and 3.6 percent cover under Alternative 2 and 319 acres and 6.6 percent cover under Alternative 3.

Without mitigation, post-treatment cover in the general forest allocation (MA-8) would be below LRMP standards and guidelines by about three (3) percent. However, as the majority of the stands being treated under the two alternatives meet the definition of black bark pine, the LRMP standard and guideline (WL-59, LRMP page 4-59) only requires 10 percent hiding cover within treatment units. Alternative 2 would retain 10 percent of the acres within each treatment unit in an untreated condition. Alternative 3 retains 20 percent of each treatment unit in an untreated state. Both alternatives would meet the standard for treated black bark pine stands.

Despite retaining 10 percent under Alternative 2 and 20 percent of each treatment unit under Alternative 3, neither alternative would meet the LRMP requirements for summer range hiding cover in non-black-bark stands. A forest plan amendment is proposed that would waive the hiding cover requirement for stands located in summer range areas on Pine Mountain only. The effects of this amendment are discussed elsewhere in this chapter.

Pretreatment of understory trees, trees four (4) inches dbh and less, during post-harvest fuel reduction treatments would result in very little loss of cover habitat. Cover in these tree sizes is primarily associated with foliage. 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 **).

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 5,243 acres. Recovery of hiding cover on those acres would likely take up to 10 to 20 years depending on site.

The creation of defensible spaces along FR 23 under Alternative 2 would eliminate three (3) miles of shrub vegetation that provides browse and hiding cover for mule deer during winter months. This cover and browse would be maintained under Alternative 3 as those acres would not be treated.

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.

Alternatives 2 and 3 would reduce the risk of high intensity wildfires reducing or eliminating cover and browse on large continuous blocks of the landscape by breaking fuel continuities and reducing fuel loadings. 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 ponderosa pine would be less likely to succumb to a wildfire 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. Thinning in the fledging and foraging habitat of the northern goshawk would minimize the risk of a wildfire damaging or destroying all or potions of the habitat. The 30 acre core nest area would not be treated under either alternative and would continue to provide conditions suitable for a crown fire should

a fire initiate within or move into the core area. Treatment of the surrounding fledging and foraging area would minimize the risk of a fire moving into the core area or by starting a crown fire by reducing both horizontal and vertical fuel continuities. Such treatment would also increase the potential for and ease of control.

Treated stands would continue to be subject to disturbance; however, large scale changes would require more extreme weather conditions.

Neither alternative would meet the 30 percent cover on other summer range areas, and particularly not on Pine Mountain. Even with the 10 percent retention under Alternative 2 and the 20 percent retention under Alternative 3, the post-treatment cover percentages would range from 23 (Alternative 3) to 27 percent (Alternative 2) and below the 30 percent standard. Recovery to pretreatment levels would likely take up to several decades until Alternative 2 and longer under Alternative 3.

In the long term, more than one decade, the impacts of both insects and wildfire on hiding would be expected to be less under both Alternatives 2 and 3 than 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. These operations 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. Existing mature and old growth aged overstory trees are more likely to survive fire events.

In the short term, suitable habitat would be maintained for the northern goshawk. Long-term, retaining high density stands in both the core nesting area and the adjacent fledging and foraging habitat increases the risk of a wildfire or bark beetle attack damaging or destroying all or portions of the habitat.

Shrub Habitat – Shrubs, primarily bitterbrush provide critical mule deer winter forage. Shrubs, and shrub habitats, also provide nesting and foraging habitat for shrub associated species such as the yellow pine chipmunk and golden-mantle ground squirrel as well as neotropical migrant birds. With approximately 89 percent of the planning area in designated winter range, the quality, quantity, and distribution of bitterbrush is an important consideration. Table 15 displays the current age-structure classes of bitterbrush within the several sub-areas in the planning area and the number of acres and percentage of bitterbrush within each of those sub-areas.

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.

Table 15 Bitterbrush Age Class and Structure by WRHU and Land Allocation, Opine Planning Area (from Table 7, Wildlife Report, page 9).

WRHU or LRMP allocation	Age Class - Structure (acres - percent of Shrub Acreage)				No Bitterbrush acres - %t of gross acreage**	Total Ac. - percent
	Early*	Mid	Late	Decadent		
General Forest	464 - **48**	150 - **16**	130 - **13**	223 - **23**	5 - <**1**	972 - 2
Lavacicle	1581 - **24**	0 - **0**	4343 - **65**	772 - **12**	791 - **11**	7487 - 14
Mahogany	4570 - **53**	94 - **1**	1805 - **21**	2085 - **24**	3558 - **29**	12112 - 22
Potholes	2608 - **27**	466 - **5**	1809 - **19**	4780 - **49**	27 - **0**	9690 - 18
Pine Mountain	2150 - **17**	3221 - **25**	3908 - **30**	3547 - **28**	617 - **5**	13443 - 25
TePee Draw	1361 - **12**	940 - **9**	3392 - **31**	5226 - **48**	0 - **0**	10919 - 20
Totals:	**12734 - 26**	**4871 - 10**	**15387 - 31**	**16633 - 34**	**4998 - 9**	**54623 - 100**

***Note**: * The Early category includes those acreages with no bitterbrush currently present but the plant association has potential for bitterbrush. The age class - structure percentages are based upon the net acreage, i.e. gross minus the No Bitterbrush acres. ** The No Bitterbrush category includes only plant associations without bitterbrush potential. Refer to the analysis file for the breakdown by class of acres field verified vs. those that were not.*

Table 16 (page 3-13) 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 and 40 percent of existing bitterbrush acres to an early stage under Alternative 2 and 3 respectively. 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.

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 – 2.5 percent of the management area annually. However, this limitation does not include mowing and does not take into account the effects of wildfire. 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.

Using S&G M7-26, it would take approximately 15 years to treat all of the acres proposed to be treated using prescribe fire under Alternative 2 and approximately 11 years to treat all of the proposed prescribe fire treatment acres under Alternative 3. Including the acres to be mowed, approximately *** under Alternative 2 and approximately 586 acres under Alternative 3, it would take slightly more than 15 years to treat all of the proposed acres under Alternative 2. All the proposed acres in Alternative 3 would be treated in 11 years.

Table 16 Fuel Reduction Treatments in the MA -7 Deer Habitat Land Allocation, Opine Planning Area (modified from Tables 24 & 25 , Wildlife Report, page 28).

WRHU	WRHU Acreage	Fire Treatment	Treatment Acreages			2.5% Maximum Treatable Acres/Yr
			Alt 1	Alt 2	Alt 3	
Lavacicle	7445	Broadcast Burn	0	1389	19	186
		Dripline Burn	0	0	1332	
Mahogany	11763	Pretreat Burn	0	78	79	294
Pine Mountain	8487	Broadcast Burn	0	1104	419	212
		Dripline Burn	0	220	220	
		Pre-treat Burn	0	3796	288	
Potholes	9677	Broadcast Burn	0	3149	2745	242
		Dripline Burn	0	421	421	
		Pre-treat Burn	0	2061	1993	
Tepee Draw	10886	Broadcast Burn	0	858	545	272
		Pre-treat Burn	0	4885	4240	
Totals	**48258**		**0**	**17961**	**12301**	**1206**

***Note**: the natural fuels treatments include the acreages overlapping planned vegetation treatment units.*

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 ***** acres in ** units proposed under Alternative 2 and approximately 2,284 acres in 14 units under Alternative 3.. 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. Retreatment of these areas would likely result in a long-term delay in shrub recovery and result in poor spatial distribution of critical winter forage for mule deer. Removing previously treated areas or modifying burning prescriptions to avoid these areas 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.

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 and decrease in both the early and mid classes over the long term and assuming no large scale wildfire.

Table 17 (page 3-15) displays the changes in distribution of age class and structure by sub-area under Alternatives 2 and 3. Under both action alternatives, the percentage of bitterbrush in the early class would increase from 26 to 46 percent; in the mid, it would decrease from 10 to five (5) percent; in the late, it would decrease from 31 to 24 percent; and in the decadent, it would decrease from 34 to 26 percent. Both the late and decadent classes would remain above the desired objective of one third of the acreage. The early class would see an almost 80 percent increase in area and would also be above the objective of one third of the acreage in this class. The mid class would see a 50 percent decline in acres. As this class contains the highest quality and quantity of browse and browse production, this could result in reduced availability for several decades or until some of the existing bitterbrush in the early class grows into the mid class. However, this may not be a significant problem for most years as observations in the Opine area have determined that during most 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.

Under Alternative 1, shrub and shrub-grass habitats would continue to decrease in size, 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. 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.

Alternatives 2 and 3 would improve xeric shrub habitats and enhance opportunities for maintaining and improving bitterbrush availability and distribution by removing most of the encroaching trees to enhance forage for domestic livestock. Alternative 2, treating 507 acres, would provide or maintain more habitat than Alternative 3 which proposes to treat 235 acres. Treatments would also maintain or enhance the production of forage species (grasses) that are favored wildlife species such as sage-grouse. Such improvements would help to reduce the risk of livestock browsing the bitterbrush and increase the amount of bitterbrush browse available to mule deer during winter months.

Coarse Woody Material, Green Tree Retention, and Snags - Coarse woody material (CWD) and snag levels are currently below LRMP standards in the Tepee Draw and Sand Springs areas of the planning. These areas would remain below LRMP standards under Alternative 1 in both the short- and long-term. CWD and snag levels meet or exceed LRMP standards on the north slopes of Pine Mountain and would continue to meet standards in both the short- and long-term under Alternative 1.
There would be no measurable change in snag levels in the short term within the planning area under Alternative 1. Long term, the number of snags would be likely to increase due to increased mortality associated with bark beetle attack, stressed induced mortality associated with overstocking, and mortality

Table 17 Effects of Vegetation and Fuel Reduction Treatments on Bitterbrush Age Class and Structure by LRMP Allocation, WHRU, and Alternative, Opine Planning Area (modified from Tables 22 and 23, Wildlife Report, pages 26 and 27).

WRHU or LRMP allocation		Age Class/Structure (acres/% of Shrub Acreage)								No bitterbrush (acres/% of area)**		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	Alt 2	Alt 3
General Forest	Existing	464/48	464/48	150/16	150/16	130/13	130/13	223/23	223/23	5/<1	5/<1	972/2 (total shrub 967 ac.)	972/2 (total shrub 967 ac.)
	Change	+256	+334	-110	-110	-85	-84	-62	-140	0	0		
	Total	720/74	798/83	40/4	40/4	45/5	46/5	161/17	83/9	5/<1	5/<1		
Lavacicle	Existing	1581/24	1581/24	0/0	0/0	4343/65	4343/65	772/12	772/12	791/11	791/11	7487/14 (total shrub 6696 ac.)	7487/14 (total shrub 6696 ac.)
	Change	+508	+539	-0	-0	-438	-466	-70	-73	0	0		
	Total	2089/31	2120/32	0/0	0/0	3905/58	3877/58	702/10	699/10	791/11	791/11		
Mahogany	Existing	4570/53	4570/53	94/1	94/1	1805/21	1805/21	2085/24	2085/24	3558/29	3558/29	12112/22 (total shrub 8554 ac.)	12112/22 (total shrub 8554 ac.)
	Change	+19	+17	0	0	-2	-2	-16	-15	0	0		
	Total	4589/54	4587/54	94/1	94/1	1803/21	1803/21	2069/24	2070/24	3558/29	3558/29		
Potholes	Existing	2608/27	2608/27	466/5	466/5	1809/19	1809/19	4780/49	4780/49	27/0	27/0	9690/18 (total shrub 9663 ac.)	9690/18 (total shrub 9663 ac.)
	Change	+2800	+2633	-312	-291	-873	-802	-1616	-1540	0	0		
	Total	5408/56	5241/54	154/2	175/2	936/10	1007/10	3164/33	3240/34	27/0	27/0		
Pine Mtn	Existing	2150/17	2150/17	3221/25	3221/25	3908/30	3908/30	3547/28	3547/28	617/5	617/5	13443/25 (total shrub 12826 ac.)	13443/25 (total shrub 12826 ac.)
	Change	+2669	+2565	-1707	-1664	-661	-606	-302	-295	0	0		
	Total	4819/38	4715/37	1514/12	1557/12	3247/25	3302/26	3245/25	3252/25	617/	617/5		
Tepee Draw	Existing	136 1/12	1361 /12	94 0/9	940 /9	3392 /31	3392/31	5226/48	5226/48	0/0	0/0	10919/20 (total shrub 10919 ac.)	10919/20 (total shrub 10919 ac.)
	Change	+3936	+3323	-463	-217	-1660	-1355	-1813	-1751	0	0		
	Total	5297/49	4684/43	477/4	723/7	1732/16	2037/19	3413/31	3475/32	0/0	0/0		
Totals	Current	12734/26	2734/26	4871/10	4871/10	15387/31	15387/31	16633/34	16633/34	4998/9	4998/9	54623/100 (total shrub 49625 ac.)	54623/100 (total shrub 49625 ac.)
	Post-Treatment	22922/46	22145/45	2279/5	2589/5	11668/24	12072/24	12754/26	12819/26	4998/9	4998/9		

associated with wildfire. There would be no measurable chance in the number of trees potentially available for future snags or CWM in the short term. Longer term, two or more decades and longer, the increasing probability of wildfire, particularly a crown fire and/or bark beetle attack would be expected to result in extensive mortality across the landscape and eliminating future snags and CWM for extended periods of time.

There would be limited direct effects from either Alternative 2 or 3 vegetation unit treatments on snags. Snags that would pose a safety risk to personnel would be removed. There would be no intentional harvest of snags for products. Treatment prescriptions proposed under both Alternatives 2 and 3 are expected to insure that adequate numbers of trees are available in the long term to meet 100 percent of the maximum population potential for both snags and green tree replacements as required in the LRMP. Snags would continue to be below LRMP requirements in the short term in the Tepee Draw and Sand Springs area but would continue to meet LRMP standards on the north side of Pine Mountain.

Fuel reduction treatments, particularly prescribe fire, are more likely to result in adverse impacts on existing and future snag and CWM levels. Alternative 2 would treat 19,663 acres or 36 percent of the planning area with broadcast burning and burning under tree drip lines. Alternative 3 would treat 17,848 acres or 3 percent of the planning area with broadcast burning and burning under tree drip lines. The acreages include both natural fuels units and vegetation harvest units with prescribed fire. Prescriptions and Project Design Criteria, including the use of cool burns, are designed to reduce the loss of existing snags to fire. However, given the large proportion of the area being treated, the use of prescribed fire poses a direct risk to existing snags and CWM. Some trees would likely be killed by fire and provide some snags. Mechanical shrub treatments would have no effect on snags but could impact some smaller diameter CMW.

Proposed silvicultural treatments in the Tepee Draw and Sand Springs areas are not expected to result in further declines in CWD in those areas under either Alternative 2 or 3. Prescribed residual tree numbers are expected to provide an adequate number of trees to meet downed wood requirements described in the LRMP as well as meet CWD needs at the 80 percent tolerance level as described in Table 3 of the DecAID Wood Decay Management Advisory Model (Silviculture Report, page 29). In contrast to Alternative 1, Alternatives 2 and 3 would result in increased tree sizes in the long term thereby resulting in larger snags and CWD more quickly in the future than would be attained without thinning (Alternative 1). Additionally, although management actions, particularly underburning, are not actively intended to provide additional snag and CWD material, research suggests that light to moderate intensity and severity underburns result in a mortality rate of approximately six (6) percent in trees greater than two (2) inches dbh (Silviculture Report, page 29). This mortality would be available to add to existing CWD levels.

In the short term, the next two to three decades, treatments proposed under Alternatives 2 and 3 would result in the reduction of recruitment of snags and CWM due to the lowering of the level of mortality caused by mistletoe, bark beetles, and wildfire. In the longer-term, snags and CWM would be enhanced by the treatments that reduce tree density, thereby increasing the average size of trees/snags due to less competition. Further, natural fuels treatments and thinning would reduce the probability of catastrophic, high intensity wildfire and thereby retaining existing snags and CWM. Gaps in snag and CWM recruitment and numbers would be minimized across the landscape.

Removal of CWM where in excess to wildlife needs would be allowable on a case-by-case basis.

Late and Old Structure Habitat/Old Growth Management Areas (OGMA) – None of the alternatives would result in the loss or removal of any stage 6 or 7 forest structure in the planning area. No treatments

are proposed in either structural class under either Alternative 2 or 3. This includes stage 6 or 7 areas within designated OGMAs. None of the alternatives would eliminate any stage 5 structure in lodgepole pine forest areas. No tree densities or canopy cover would be reduced under Alternative 1. Treatments proposed in stage 6 stands under both Alternative 2 and 3 would reduce tree densities and canopy cover. Stage 5 ponderosa pine stands would not be treated under Alternative 1 but would under both Alternatives 2 and 3. These would reduce stand densities, increase growth rates of residual trees, promote regeneration, and ultimately speed the development of these stands into stage 6 structure and habitat.

Table 18 (page 3-18) summarizes the effects of treatments within LOS stands including those in OGMAs.

The effects of treatments on LOS and OGMAs under both alternatives are dependent upon the individual stand prescriptions. Those that simplify the stand structure of stage 6 or stage 7 by removing the understory and mid-story trees (either by cutting, fire or both) would promote seral stage 7, which is below the levels associated with the historic range of variability for dry interior forests with relatively frequent wildfires. Treatments within stage 6 that maintain understory and mid-story trees while reducing the competitive stresses between trees should maintain stage 6 in the long-term.

The prescriptions within the OGMAs for Alternative 2 were not designed for any long-term desired condition but would simply reduce tree densities with the goal of mitigating potential risks of catastrophic insect/disease epidemics and/or wildfires.

The prescriptions within the OGMAs for Alternative 3 were designed for long-term desired conditions. The Pine Mountain OGMA has the desired condition of providing stage 6 habitat for the northern goshawk. The Pumice Springs OGMA has the desired condition of providing stage 7, single-story LOS for dependent species in ponderosa pine and stage 5/6 in lodgepole pine.

Connectivity and Fragmentation – Table 19 (pages 3-19 through 3-21) summarizes the overlapping of treatments on designated corridors by Alternatives 2 and 3 respectively. The corridors would only be thinned in order to meet their respective management objective(s), including maintenance or enhancement. 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 travel corridors may be necessary 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. Indirect negative effects could occur if the corridors are not adequately protected during the implementation of vegetation or natural fuels treatments (e.g. equipment impacts, loss to fire).

All alternatives would meet standards, guidelines, and direction described in the Eastside Screens. Under Alternative 1, no treatments would be implemented in designated corridors. 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.

Table 18 Acres Treated by Vegetation and Fuel Reduction Treatments by Structural Class, OGMA or Sub-Area , for Alternatives 2 and 3 (modified from Tables 27a & 27b, Wildlife Report, pages 30 & 31).

OGMA or Sub-Area	Current Acres by Stage				Prescriptions (SS - acres)						Effects (Treated Ac/Total Ac)	
	SS5 LPP	SS6/7 LPP	SS6 PP	SS7 (PP	Burn*		Thin		Pre-thin/ Burn or Mow*			
					Alt 2	Alt 3	Alt 2	Alt 3	Alt 2	Alt 3	Alt 2	Alt 3
Pine Mt. OGMA	0	0	542	75	SS6 - 5	SS6 - 11	SS6 - 404 SS7 - 30	SS6 - 494 SS7 - 56	SS6 133 SS7 45	SS6 - 36 SS7 - 16	PP 616/617 (100% treated)	PP 613/617 (99% treated)
Pine Mt. Sub-Area	0	0	1625	99	SS6 - 95	0	SS6 - 489 SS7 - 25	SS5 - 100 SS6 - 80	SS6 - 735 SS7 - 39	0	1484/1724 (86% treated)	LP 180/190 (95% treated)
Pumice Springs. OGMA	109	81	<1	0	0	SS6 - 109	SS5 - 57 SS6 - 61	SS6 - 853 SS7 - 26	0	SS6 - 493 SS7 - 38	LPP 117/190 (62% treated); PP 0/0	PP 1521/1724 (88% treated)
TePee Draw Sub-Area	0	0	1257	171	SS6 - 42	SS6 - 42	SS6 - 497 SS7 - 97	SS6 -475 SS7 - 97	SS6 - 461 SS7 - 66	SS6 - 482 SS7 - 66	PP 1163/1428 (81% treated)	PP 1162/1428 (81% treated)
Potholes Sub-Area	204	665	756	238	SS5 - 61 SS6 - 28 SS7 - 85	SS5 - 61 SS6 - 127 SS7 - 187	SS6 - 258 SS7 - 10	SS6 - 269 SS7 - 10	SS6 - 398 SS7 - 24	SS6 - 387 SS7 - 24	LPP 178/869 (20% treated); PP 888/994 (89% treated)	LPP 178/1421 (13% treated); PP 888/994 (89% treated)
Mahogany Sub-Area	1307	2266	311	0	0	0	SS5 - 148 SS6 - 118	SS5 - 155 SS6 - 141	SS5 – 7 SS6 - 34	SS5 - 6: SS6 - 21	LPP 268/3573 (8% treated); PP 39/311 (13% treated)	LPP 289/3573 (8% treated); PP 34/311 (11% treated)
Lavacicle Sub-Area	289	359	657	12	SS6 - 186	SS6 - 143	SS5 - 221 SS6 277	SS5 - 224 SS6 - 323	0	0	LPP 356/648 (55% treated); PP 328/669 (49% treated)	LPP 360/648 (56% treated); PP 330/669 (49% treated)
General Forest Sub-Area	13	13	72	49	0	0	SS6 - 28 SS7 - 49		SS6 - 44		PP 122/122 (100% treated)	PP 122/122 (100% treated)
Totals:	1922	3384	5220	644	802	680	2771		1986		5559/11170 (50% treated)	5677/11170 (51% treated)

*Note: * acreages for fuels treatments are those outside of the vegetation units.*

Table 19 Effects of Vegetation Treatments on OGMA, LOS, and Deer Connectivity Corridors (adapted from Tables A-3 and A-4, Appendix - Wildlife Report, pages 51 & 52)

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	Alt 3
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	10% retention required in all corridors within thinning units as mitigation	20% retention required in all corridors within thinning units as mitigation
2 Travel	252 - 274	Veg/Pretreat (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	Veg/Pretreat	43 - 45	36 - 38	No Effect - all thinning in corridor would meet screens	9 ac. marg.	3 ac. marg.

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	Alt 3
		(43)	(36)					
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.
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.

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	Alt 3
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)						

Note: * Treatment acreages are totals by general prescriptions. Unit specific prescriptions are located in the Silviculture and Fire/Fuels Report and the analysis files for the project.

Raptor Nest Sites and Habitat - There is only one active goshawk and one golden eagle site within the planning area. There is one probable but unconfirmed goshawk site and a number of historic golden eagle nests.. The goshawk Post-Fledgling Area (PFA) and Nest Core would be treated by both action alternatives. The golden eagle site does not have a site allocation so an analysis area one quarter mile in radius was used to determine effects due to both action alternatives. Both the goshawk and eagle sites are on Pine Mountain.

Table 20 (page 3-23) summarizes the proposed treatments and their expected impacts for both action alternatives.

Assuming no disturbance by wildfire and/or insects, the essential habitat components (nesting and foraging) for the goshawk site would be maintained under Alternative 1 because canopy cover levels would not change over the short term. However, over the long term, 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.

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 the residual canopy cover levels would be too low. The elimination of small tree clumps in the understory would reduce habitat of bird species that are potential prey for goshawks.

In the short term, there would be no measurable effect on golden eagle habitat or habitat components under Alternative 1. Long term, continued tree encroachment and increasing stand densities would reduce the quality, quantity, and distribution of existing habitat. 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.

The effects of treatments from Alternative 3 on raptor nest sites are negative in the short-term where thinning would be done because the 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.

In the long-term 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.

There are no known adverse effects from the treatments on golden eagle habitat components. Trees that are potential nesting habitat would not be harvested. Eagles prefer more open habitats so the thinning of the understory would be a positive effect. Long term, reducing stand densities would reduce the risk of bark beetle attack and/or the risk of wildfire killing or removing suitable nest trees. Thinning would help to more quickly develop larger diameter trees with larger limbs suitable for future nesting sites.

Table 20 Vegetation and Fuel Reduction Treatment Impacts on Raptor Sites, Opine Planning Area (modified from Tables 28a &28b, Wildlife Report, pages 32 & 33).

Nest Site ID	Alternative 2					Alternative 2			
	Gross Acres	Units	Prescription(s)*	Treated Acres**	Effects	Units	Prescription(s)*	Treated Acres**	Effects
N. goshawk Nest Core	30	H09 SD02 F09	MTT STT Pre-treat/burn	20 10 30	Fuels treatments overlap veg units. Prescriptions were not designed for goshawk objectives. Treatments will negatively affect canopy cover. 100% treated.	P346 F09	STT Pre-treat/burn	30 30	Fuels treatments overlap veg units. Short-term there would be potential negative effects on canopy cover, and understory stand structure for prey species. 100% treated.
N. goshawk PFA	400	H09 P07 P08 SD02 SD08 F9, 17, 36 F35	MTT STT STT STT STT Pre-treat/burn Pre-treat/mow	100 72 7 37 14 391 10	Fuels treatments overlap veg units. Prescriptions were not designed for goshawk objectives. Treatments will negatively affect canopy cover, and understory stand structure for prey species. 100% treated.	P309,P315 P324 P346 F09, 17,36 F35	STT STT STT STT Pre-treat/burn Pre-treat/mow	45 157 14 148 384 13	Fuels treatments overlap veg units. Short-term there would be potential negative effects on canopy cover. 100% treated.
Golden eagle site	125	H03 H04 P02 P03 F01	MTT MTT STT STT Pretreat/burn	9 44 13 42 125	Fuels treatments overlap veg units. Prescriptions will not adversely affect golden eagle habitat. 100% treated.	C303 P302 P303 P304 P305 F01	MTT STT STT STT STT Pre-treat/burn	34 14 32 38 1 125	Fuels treatments overlap veg units. Prescriptions will not adversely affect golden eagle habitat. 100% treated.

Notes: * STT- Thinning of trees up to 16 inches dbh. MTT – Thinning of trees up to 21 inches dbh. Pretreat – Remove all trees up to 4 inches dbh.

** Treated acres do not total to gross acres due to multiple treatments on the same acre.

Greater Sage-grouse – Alternative 1 would retain current quantities, quality, and distribution of habitat for the greater sage-grouse in the short term, 10-15 years or so. Long term, 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. 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.

Habitat for the greater sage-grouse would be maintained or improved under Alternatives 2 and 3. Alternative 2 would maintain or improve approximately 24 percent (2,782 acres) of the historic habitat, 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.

Alternative 3 treats a smaller percentage, approximately 20 percent (2,370 acres) of the historic habitat in mixed forest/shrub areas but also proposes to treat an additional 6,769 acres (approximately 59 percent) of historic habitat, primarily nesting and brood rearing habitat in shrub and shrub-grass habitats, outside of the vegetation and fuel reduction units. Impacts of treatments in forest areas would be similar to those described for Alternative 2 but on fewer acres. The additional acres proposed for the removal of encroaching trees would retain larger, older trees – ponderosa pine 16 inches and larger and juniper 14 inches and larger – trees that were likely present prior to the initiation of fire suppression in the early 1900s. Because of the scattered nature and limited numbers, these residual trees would be expected to have no measurable effect on the quantity, quality, or distribution of sage-grouse habitat on the landscape. These scattered residual trees would continue to provide perch sites for predators. Predation on adult and immature birds would be expected to more closely approximate historic levels.

Special/Unique Habitats including Ecotones – None of the alternatives would have any direct, indirect, or cumulative effects to Lavacicle cave, natural springs, the several natural springs, 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 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 may impact forest ecotones that contain lava outcrops, forested lavas, ecotones that contain cliffs and rock outcrops, and mountain mahogany patches under both action alternatives.

There are no wet meadows, aquatic/riparian habitats, natural streams, lakes, or ponds, or talus slopes within the planning area. There are no known aspen patches. There would be no effects on these areas under any of the alternatives.

Ecological Indicator Species/Habitats, Species of Concern, and Land birds – There are no measurable short-term direct, indirect, or cumulative effects identified on this species or habitats under Alternative 1 because no vegetation or fuel reduction treatments would be implemented. Long term, the risk of a severe wildfire and/or bark beetle infestation would likely result in the loss of or damage to habitats

supporting these species and resulting in reductions in the population and diversity of species that utilize those habitats.

Under Alternatives 2 and 3, project design criteria 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-term negative effects on this large group of species. Specific effects of the proposed activities are described elsewhere in this document. 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. In the long term, reduction in the risk of high intensity wildfire and bark beetle attack, would also reduce the risk and potential of large or landscape level losses of habitat resulting in reductions in population numbers and species diversity within those habitats. Expected losses associated with historic fire events and insect activities would be expected to more closely approximate historic levels.

Management Indicator Species (MIS) – Table 1 in the Wildlife Report (pages 2-4) lists the species of MIS found in the Opine planning area.

There would be no measurable direct or indirect effects on these species or their habitats under Alternative 1 because no vegetation or fuel reduction treatments would be implemented. Long term, more than 10-15 years, the risk to these species and/or their habitats from wildfire and/or bark beetle infestation would increase. Wildfire particularly would result in a shift to early seral habitats dominated by grasses and forbs with few shrubs and trees. Existing late and old structure stands along with other mature forested areas and shrub communities would be more likely to be lost. Unique and special habitats, or the vegetative communities surrounding them, would also face an increased risk and likelihood of loss or damage, particularly from wildfire.

Implementation of proposed fuel reduction and vegetation treatments without any mitigation measures have, in general, negative impacts on MIS species (Table 29, Wildlife Report, page 34).

Fuel Reduction Treatments (mowing, prescribe fire) - Implementation of either alternative with the proposed design criteria and mitigation measures would be expected to result in little or no measurable direct or indirect impact on the northern goshawk; the sharp-shinned, red-tailed, or Cooper's hawks, the golden eagle, great gray owl, Williamson's sapsucker, mule deer, the Townsend's big-eared bat, or species associated with special or unique habitats. In general, this is due to the protection of the habitat, including snags, thickets, coarse woody material, and unique features that these species depend on.

Short and long impacts on woodpeckers – Lewis', white-headed, and black-backed; would be expected to be positive because existing snags would be retained, burnt trees and snags would also be retained, and scattered understory patches would be left untreated.

Effects on elk and species associated with various plant communities and successional stages would experience a range of positive and negative impacts in both the short and long term. In the short term, elk would lose hiding and thermal cover. This would be at least partially mitigated for by the road closures under both alternatives, and the area closure and the seasonal closure in treatment unit from December 1st to March 31st of the following year areas under Alternative 3. The seasonal closures under Alternative 3 would result in a reduction in the risk of harassment of elk as well as deer during critical winter months and thereby helping to potentially increase survival rates.

Similarly, species associated with various plant communities and successional stages would also experience a range of impacts. Species favoring structural stage 7 would see improved habitat conditions in both the short and long term. Those than favor dense stands would experience a reduction in the

quality, quantity, and distribution of habitat until stand densities again increased over the next several decades.

Only species associated with downed logs and other coarse woody material such as the pine marten would be expected to see a limited negative impact from the implementation of fuel reduction treatments. The impact would be greatest with Alternative 2 because it would use prescribe fire, and particularly broadcast burning, on more acres than under Alternative 3. The use of "cool" burns would minimize the loss of downed logs and other coarse woody material but some losses would be expected. Over time,

Fuel reduction treatments under both alternatives would be expected to have no measurable direct and indirect effect on western big-eared bat or its habitat. Roosting habitat, primarily caves or lava tubes, would be protected with no treatment buffers surrounding known or suspected sites. Protection of snags would help to maintain day roosting sites. Unknown sites discovered during unit layout or implementation would be avoided further reducing the risk of impacting this species.

Vegetation Treatments (commercial and non-commercial harvest) – Similar to fuel reduction treatments, without the proposed design criteria and mitigation measures, impacts from vegetation treatments on MIS species are generally negative although, depending on the species, they also range from very negative to positive. Protecting nest sites results in no measurable direct or indirect, short or long-term effects on the red-tailed and Cooper's hawk. Golden eagles, goshawks, and sharp-shinned hawks achieve higher nesting success when the solitude of nest sites is protected. Implementation of thinning prescriptions produce larger diameter trees with potentially larger limbs thereby also improving the quantity and distribution of future nest sites, especially for eagles. However, thinning dense stands reduces potential nest sites for sharp-shinned hawks in the short term, 10-15 years. However, short term losses of habitat are offset by long term gains in habitat retention because the risk of loss or damage due to wildfire or insects is reduced. Retention of dense lodgepole pine LOS patches near large forest openings would also result in no measurable direct or indirect impacts on great gray owls as such sites would continue to provide suitable nesting habitat adjacent to or near suitable foraging habitat.

All existing snags would be retained except those deemed to pose safety concerns during harvest operations under both alternatives. Trees and snags burned during slash and fuel reduction treatments would be retained. This would maintain and potentially increase short and long term habitat for both the Lewis' and white-headed woodpeckers and would have no measurable direct or indirect effect on the black-backed woodpecker. Protecting snags and downed logs would also have no measurable effects on the Williamson's sapsucker.

Protecting logs and other coarse woody material would also minimize reductions in the quantity and distribution of habitat for species associated with such material. With protection measures some losses would be expected reducing the number and distribution of such habitats in the short term. Long term, protection of existing snags, green tree retention, and retention of snags and trees burned during slash or fuel reduction treatments would help to restore the numbers and distribution of such materials across the landscape.

Impacts on elk would be similar to those identified for fuel reduction treatments but because the removal of cover, particularly thermal cover, is greater from harvest activities than from fuel reduction treatments, the degree of impact would be greater. The closure of roads, and particularly the seasonal closure that would be implemented under Alternative 3, would be more important in vegetation and combination vegetation and fuel reduction units than in fuel reduction only units.

Species associated with various plant communities and successional stages would also experience a range of impacts similar to that expected from the implementation of fuel reduction treatments. Species

associated with structural stage 7 stands would expect an improvement in the quality, quantity and distribution of such stands to a limited extent in the short term and to a much greater extent in the longer term. However, species dependant on or using dense stands or patches of trees would see a reduction in both the quantity and distribution of such habitat in the short term. Long term, regrowth would be expected to increase both the quantity and distribution of such habitat. However, assuming that management actions to reduce the risk of uncharacteristic wildfire and insect attack would continue, it is not reasonable to expect that the quantity of such habitat on the landscape would approach that existing at the present time.

There would be no measurable direct and indirect effects of vegetation treatments on species associated with special or unique habitats. No treatment units are proposed within such habitats. Habitats within or adjacent to treatment units would be protected with untreated buffers.

Proposed vegetation treatments would potentially improve conditions for the western big-eared bat. Impacts would be expected to be similar to those described for fuel reduction treatments.

MIS Summary - Regardless of the activity, fuel reduction, vegetation treatment, or a combination of both, the application of the proposed design criteria and 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 (Wildlife Report, page 34).

Access and Travel Management – Current road and motorized trail densities would be maintained under Alternative 1. Habitat would continue to be fragmented. Experience suggests that road and motorized trail densities associated with user-created roads and trails would actually continue to increase for the next several years or until the forest plan is amended to restrict OHV use to designated roads and trails. In additional to further fragmenting of habitat, such use, particularly during winter months or during nesting or calving season, would increase the harassment of wildlife resulting in increased mortality and reduced breeding success. Habitat effectiveness would continue to decline. The greatest impacts would continue to occur in areas outside of the East Fort Rock OHV area because OHV use is not restricted to designated roads and trails. Impacts would also be expected within the East Fort Rock OHV area but at more limited level. There is currently no available information that quantifies the increase in user-created roads and trails so quantifying the degree of increase is not possible.

The current seasonal road closures imposed during the fall hunting season would continue to be implemented reducing average open road densities to approximately 2.92 miles per square mile during that time period. No additional seasonal closures would be implemented; current road and motorized trail density (system and non-system) would remain at approximately 4.96 miles per square mile and above LRMP standards and guidelines.

Table 21 displays road and motorized trail densities by alternative, land allocation, and WRHU. These figures include system roads and trails in addition to user-created, unauthorized roads and motorized trails. A seasonal road closure is implemented during the fall hunting season over much of the planning area; the last column displays road densities during this time period.

Table 21 Road/Motorized Trail Densities by Alternative, Land Allocation, and WRHU, Opine Planning Area (from Table 21, Wildlife Report, page 25 and Table 5, Wildlife Report, page 5).

WRHU or LRMP Allocation	Alt 1 Road/Trail Density (mi./sq. mi.)	Alt 2 Road/Trail Density (mi./sq. mi.)	Alt 3 Road/Trail Density (mi./sq. mi.)	Target Open/Trail Density (mi./sq. mi.)	Hunting Season Road Closure Road (Green Dot) Density (mi/sq. mi.)
Non-Winter Range	6.43	6.43	6.05	2.5 (LRMP WL-53)	5.46
Lavacicle	3.95	3.86	3.54	1.0-2.5 (LRMP M7-22)	.0.43
Mahogany	4.47	4.03	3.81	" "	0.68
Pine Mountain	2.43	2.29	2.29	" "	1.20
Potholes	7.90	7.74	7.74	" "	5.62
TePee Draw	6.60	6.47	6.47	" "	6.61
Project Averages	4.96	4.77	4.67	----------	2.92

Alternatives 2 and 3 would close or decommission 13 and 25 miles of existing system roads respectively. Resulting road and motorized trail (system and non-system) would decline to approximately 4.77 miles per square mile under Alternative 2 and to approximately 4.67 miles per square mile under Alternative 3. These figures do not include seasonal road closures. Road densities under both alternatives would continue to remain above LRMP standards and guidelines.

Addition of the hunting season road closures reduces the overall average road density to approximately 2.73 miles per square mile under Alternative 2 and to approximately 2.63 miles per square mile under Alternative 3. Both would continue to be above the LRMP standard. Road densities in non-winter range areas and the Tepee Draw and Potholes WRHUs would continue to remain well above the LRMP standard.

An area closure to limit motorized vehicles to designated roads and trails would be implemented under Alternative 3 but not under Alternative 2. This would close all non-system roads and trails to motorized vehicles, including OHVs. Alternative 3 would also impose an area closure to OHV use on those lands in the planning area outside of the East Fort Rock OHV area. OHV use would be restricted to designated roads and trails. This would reduce total road and motorized trail densities to approximately *** miles per square mile under Alternative 3. The lack of a closure under Alternative 2 would leave open road mileage at approximately *** miles per square mile. Both actions would reduce habitat fragmentation and reduce the harassment of wildlife during nesting, calving, and winter periods. Unless aggressively enforced, this closure would not realistically eliminate user created roads and trails within the planning area but it would be expected to greatly reduce the rate of expansion and the levels of use off of designated routes.

Alternative 3 would also implement a seasonal closure of roads and motorized trails between December 1 and March 31 of the following year. Closures would reduce current road and motorized trail densities to or below the LRMP standard of 2.5 miles per square mile.

As a result of current and proposed road and area closures, including seasonal closures, habitat fragmentation would be reduced. Harassment of wildlife during winter months would be reduced, and in

the case of Alternative 3, would be eliminated between December 1st and March 31st of the following year. Both alternatives would see an increase in habitat effectiveness with the greatest increase expected under Alternative 3. Road densities would decline under both alternatives but would remain above the LRMP standard under Alternative 2. The LRMP stand would be met or exceeded under Alternative 3 with the seasonal closure.

Proposed, Endangered, Threatened, and Sensitive (PETS) Wildlife Species – There are no known direct or indirect effects on ferruginous hawks, peregrine falcons, or pygmy rabbits under any of the alternatives.

There is no known occupancy of the area by either ferruginous hawks or peregrine falcons. Grassland and desert steppe habitats utilized by ferruginous hawks would not be impacted. Juniper woodlands, also utilized by hawks, would only be minimally impacted and nearby BLM managed lands contain higher quality juniper woodland habitat.

Cliffs, favored by peregrine falcons, would not be impacted because no treatment units contain or are adjacent to such sites. The Opine planning area also contains no suitable foraging habitat for this species.

There is a very low probability of pygmy rabbits occupying the planning area. There are no treatments planned under either action alternative in sagebrush dominated plant associations that would substantially eliminate or degrade sagebrush cover. This species does not occupy forested areas; therefore vegetation and fuel reduction treatments in those areas would have no impacts on either the species or its habitat.

Forest Plan Amendments – Alternative 1 would not waive either the thermal cover objective within the deer winter range land allocation (MA-7) nor standard and guideline WL-54 for hiding cover within deer summer range. Thermal cover would continue to remain below the LRMP objective of 30 percent thermal cover within the MA-7 allocation throughout the planning area. Retention of existing tree stocking levels would be expected to result in both an increase in stocking levels and an increase in the percent of thermal cover over time. It is highly unlikely that the planning area will be capable of establishing and sustaining stocking levels to meet the MA-7 thermal cover objective in the long term due to the increasing risk of loss or damage to all or most of the dense stands due to bark beetle infestation and/or wildfire which would be expected to remove most or all thermal cover in affected areas. Recovery after such events, even to current levels, would be expected to take decades or even centuries.

Similar impacts would be expected to the levels of hiding cover within deer summer range. However, because hiding cover is not dependant upon canopy levels, bark beetle infestation and, to a lesser extent, wildfire, would be expected to retain at least some cover for perhaps 1-2 decades after the event or until the resulting snags fell to the ground. Recovery would be much quicker than for thermal cover, requiring only enough time for new regeneration to reach a minimum height of five (5) feet or more, perhaps 1-2 decades. However, a high intensity wildfire, more likely due to existing fuel loadings and stand densities, is more likely to result in a more complete loss of and consumption of standing stems. This is more likely to result in the complete loss of hiding cover within several years of the event. Assuming a high intensity fire, it is also unlikely that regeneration of new trees would occur in either the short or longer term. The 1959 Aspen Flats fire currently contains little or no tree regeneration in much of the affected area suggesting that the recovery of hiding cover could take a century or more in many areas assuming no planting or other actions that would encourage or supplement natural regeneration.

The difference between Alternatives 2 and 3 in terms of impacts of waiving the thermal cover objective in winter range is relatively limited as was previously discussed. Both alternatives would place residual thermal cover at between two (2) and three (3) percent across the planning area. However, because the reduction in stocking levels would reduce the risk of either a significant bark beetle infestation and/or

high intensity wildfire, both would help to retain cover across the landscape into the future. In the long term, increasing stocking levels would increase the level of thermal cover under both alternatives. Although increasing stand densities would also result in increases in the risk of bark beetle infestation and wildfire, the level of impacts associated with one or both events would be expected to be more localized in area and therefore be more likely to retain higher levels of cover across the landscape, especially when compared with Alternative 1. Neither alternative would create conditions capable of sustaining the LRMP thermal cover objective while also minimizing the risk and impact of bark beetle infestation or high intensity wildfire.

Similar impacts would be expected with regards to hiding cover in deer summer range. Standard and Guideline WL-54 is specific to non-black bark stands which at the present time, are largely limited to the north aspects of Pine Mountain. However, existing black bark stands across the remainder of the planning area are approaching the point where they will not be considered to be black bark stands and will therefore be subject to this standard. Alternative 2 would meet standard and guideline WL-59 which requires that 10 percent of treated stands provide hiding cover; Alternative 3 increases this percentage to 20 percent. Treatment units in existing black bark stands would therefore be in compliance with the LRMP for the next 1-2 decades or until these stands were no longer considered to be black bark.

In existing non-black bark stands, neither alternative would meet WL-54 because neither would retain 30 percent in hiding cover. Alternative 2 would retain 10 percent and Alternative 3 20 percent in an untreated condition within treatment units. Similar to thermal cover, over the long term, multiple decades, hiding cover would begin to approach the LRMP standard of 30 percent. Alternative 3, because it retains a higher percentage of cover immediately after treatment would be expected to approach or exceed the standard at a quicker rate than Alternative 2. It is unknown as to how long this would take.

Although post-treatment cover percentages in treatment units would be below the LRMP standard, the reduced stand densities would also reduce the risk of bark beetle infestation and/or wildfire thereby significantly reducing the risk that such disturbance vents would result in significant changes in the amount or distribution of existing and developing cover. Impacts of endemic and historic fire frequencies/levels would be expected to be similar to those described for thermal cover in both the short and long term. It is unknown if non-black bark stands can sustain 30 percent cover and also be at low risk to wildfire and bark beetle infestation, at least on Pine Mountain. It is unlikely that such cover levels can be sustained in the Tepee Draw and ponderosa pine dominated stands in the Sand Springs area.

Condition of Existing Vegetation

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. Under Alternative 1, none of these acres would have stand densities reduced. No measurable change in the number of acres at risk would be expected during the next 5-10 years. Longer term and assuming no disturbance from wildfire or insect attack, 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 understories, 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.

A total of 179 acres of ponderosa pine stands currently contain dwarf mistletoe. None of these acres would be treated under Alternative 1. In the short term, a small, increase in severity would be expected. A measurable increase in the number of acres affected may or may not be detectable. Growth reductions may or may not be detectable. Longer term, two or more decades, increases in both severity and affected acres would be expected. Growth reductions would be more likely to be detectable.

Alternatives 2 and 3 would treat 43 and 51 percent of the acres currently rated as moderate or high risk of bark beetle attack. This would result in 6,020 acres under Alternative 2 and 5,164 acres under Alternative 3 with continued bark beetle risk ratings of moderate or high in the short term.

Alternative 2 would eliminate dwarf mistletoe on 38 acres by clearcutting those acres and replanting. Thinning in the adjacent acres would target infected trees for removal reducing the risk of immediate re-infection of the planted seedlings. Long term, assuming no additional treatments, infection severity levels in adjacent residual trees would increase and would be expected to result in increased infection levels in the planted seedlings, especially those near the edges of the plantation. Precommercial thinning and pruning 2-3 decades in the future would help to minimize growth losses in the future. It would not measurably change the area of the infestation, only the degree of severity. Thinning in the remaining portions of the infected stands would remove the most of the most severely infected trees. Current growth losses associated with the infected trees would slow for the short term, but time, the level of severity would again increase and growth reductions would again increase. An increase in the number of acres infected would also be expected to increase.

The effects under Alternative 3 are the same as for Alternative 2 except that no regeneration harvest would occur on those infected acres. Mistletoe would not be eliminated on 38 acres. Thinning would target the most severely infested trees for removal. Impacts would be expected to be similar to those described for Alternative 2.

Wildfire Risk

Table 22 displays the change in the number of acres by fire behavior potential following treatment under each alternative.

Table 22 Changes in Fire Behavior Potential Following Vegetation and Fuel Reduction Treatments, Opine Planning Area.[25]

Fire Behavior Potential	Current Acres	Alt 1 – No Action		Alt 2 – Proposed Action		Alt 3	
		Post-Treatment Acres	Percent Change	Post-Treatment Acres	Percent Change	Post-Treatment Acres	Percent Change
Extreme/High	18,491	0	0				
Moderate	27,775	0	0				
Low	6,581	0	0				

[25] Acreage figures are approximate and are gross unit acres not actual treated acres. The mosaic of treatments proposed across units, especially within fuel reduction units, result in reduced behavior potential across the entire unit not just the treated acres.

Under Alternative 1, there would be no change in fire behavior potential; approximately 87 percent of the planning area acres would remain at moderate to extreme/high fire behavior potential. The number of acres remaining at moderate to extreme/high behavior potential would decline to ****** acres or ** of the planning area under Alternative 2 and to ******* acres or ** percent of the planning area under Alternative 3.

Under Alternative 1 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. 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 (Silviculture Report, page **). 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.

Under Alternatives 2 and 3, stands 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 **). 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. This type of thinning 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 decline and the number of mature and old growth aged trees lost to fire would decline.

Other Effects

Soils – Under 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 totals 956 acres or approximately 1.8 percent of the planning area.

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. It is likely that natural processes – freeze/thaw cycles, revegetation, etc. – have restored soil quality over time. Therefore, these impacts are not included in the estimated impacts of past activities.

There are approximately 297 miles of system roads occupying an estimated 474 acres which have converted soils to a non-productive condition. This is approximately 0.9 percent of the planning area. No new roads would be constructed and no system roads would be closed or decommissioned.

Detrimental soil conditions associated with recreation use, livestock grazing, and special use permit areas is relatively minor when compared to the current road system and logging facilities. There are 81 dispersed sites, one developed campground and 93 miles of OHV trails. This equates to approximately 86 acres of detrimentally impacted soils or less than 0.02 percent of the planning area. This includes 72 acres of OHV trails, 10 acres associated with dispersed sites, less than two (2) acres associated with the Pine Mountain and Sand Springs Campgrounds, and 1-2 acres associated with existing or proposed facilities and infrastructure within the Pine Mountain Observatory special use permit area.

An additional 7.5 miles of user created trails (approximately 5.5 acres) have been identified within the planning area. This is at best a conservative estimate as there is no formal inventory of such trails.

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.

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.

Based on the above information, there are 1,586 acres of detrimentally impacted soils within the planning area. This is approximately 2.9 percent of the planning area acres. Existing logging facilities, approximately 1.8 percent, and the transportation system (roads and OHV trails), approximately one (1) percent, provide the majority of detrimentally impacted soils. The remainder totals less than 0.1 percent of the area.

There would be no changes in the levels of coarse woody debris (CWD) or surface organic matter under Alternative 1. Current levels of CWD and surface organic matter are unknown although 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 that had management activities implemented prior to LRMP implementation in 1990 that likely contain less than desired amounts of CWD. It is likely that levels of both CWD 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. Levels of CWD and surface organic matter would continue to be maintained or improve until a wildfire event. Existing and future 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 CWD in areas when it occurred. The timing and location of such an event cannot be determined only that it will occur.

Fuel loadings in xeric shrub communities, transitional range, and forested areas would continue to increase thereby increasing the risk of a severe wildfire with high fire intensity and/or long duration. These conditions increase the risk that, should such a fire occur, large areas of vegetation would be killed 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, and the destruction of the litter layer. In the longer term, these types of fire remove or reduce coarse woody debris that provides long-term nutrient input and water storage capability that help to support the growth and development of both flora and fauna.

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.

Unrestricted off-highway (OHV) vehicle travel would continue to be permitted in the 28,647 acres of the planning area outside the East Fort Rock OHV trail system area. Although there is no accurate inventory of the number or miles of non-system user-created roads and trails in the planning area, conservative estimates suggest that there are approximately 29 miles involving approximately 50 acres with associated detrimental soil impacts, primarily compaction and displacement. These routes would continue to be used and additional ones created, at least until new forest direction regarding off-highway motorized use is established and implemented in the next few years. It is unlikely that funding would be available to close and rehabilitate existing user-created routes.

Because no management actions would occur under this alternative, no design criteria or mitigation measures would be required.

The level of detrimental soil impacts associated with timber harvest activity would increase under both Alternative 2 and Alternative 3. Soil productivity monitoring has shown that detrimental soil conditions increase each time a stand is treated with mechanical equipment (Soils Report, page 14) 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.

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 3-5 passes or more over the same piece of ground (Soils Report, page 8). 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 will 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.

Table 23 summarizes current, 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 nor does it include any detrimental impacts associated with tree removals in the range enhancement units (both alternatives) or the sage-grouse habitat enhancement units (Alternative 3 only). Unit by unit soil conditions are described in the Tables 3-4 (Alternative 2) and 3-5 (Alternative 3) on pages 17-20 in the Soils Report. The following discussion provides further summary discussion of the impacts of harvest activity in proposed harvest units.

Under Alternative 2, ground-based equipment would be used in 70 harvest units totaling 6,449 acres. There are an estimated 219 acres, or approximately 3.4 percent of the proposed treatment acres, of detrimentally disturbed soil within those 70 units. Analysis of the proposed harvest units identified that four (4) of those proposed units, H07, H38, H41, and P04, had detrimental soil conditions in excess of 20 percent of the unit area (Table 3-4, Soils Report, pages 17-19). The analysis also predicts that the proposed harvest and skidding activities would result in a total increase of 714 acres of additional soil impacts. 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

Table 23 **Summary of Detrimental Soil Conditions Following Proposed Harvest and Soil Restoration Activities for Alternatives 2 and 3 (source: Table 3-6, Soils Report, page 26).**

Net Change in Detrimental Soil Condition from Existing Condition	Alternative 2			Alternative 3		
	Detrimental Soil Condition			Detrimental Soil Condition		
	<=20%	>20%	Total	<=20%	>20%	Total
Existing Condition	66 units 142 Ac.	4 units 77 Ac.	70 units 219 Ac.	75 units 241 Ac.	1 unit 58 Ac.	76 units 281 Ac.
No change	1 unit 2 Ac.	---	1 unit 2 Ac.	---	---	0 units
Increase, but within LRMP Standard of 20 %	64 units 858 Ac.	---	64 units 858 Ac.	75 units 728 Ac.	---	75 units 728 Ac.
Decrease (Net Improvement)	2 units 5 Ac.	3 units 66 Ac.	5 units 71 Ac.	---	1 unit 53 Ac.	1 unit 53 Ac.
Post-Project Condition	67 units 865 Ac.	3 units 66 Ac.	70 units 931 Ac.	79 units 728 Ac.	1 unit 53 Ac.	80 units 781 Ac.

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) and that one unit (H28) would experience no change. The remaining six 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 (Table 3-4, Soils Report, pages 17-19).

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. 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 Table 3-4 and is reflected in Table 22 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 3 Soils Report, pages 17-19). Sixty-four (64) harvest units would experience increased levels 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: 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.

Under Alternative 3, ground-based equipment would be used in 76 proposed harvest units totaling 7,729 acres. There are an estimated 281 acres, or approximately 3.6 percent of the proposed harvest unit acres, of detrimentally disturbed soils in those 76 units. Analysis of the proposed units identified 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 781 acres of additional soil impacts across the 76 units (Table 3-5, Soils Report, pages 19-20). Detrimental soil conditions would remain at or below the LRMP standard in 66 of those units. In the remaining nine (9) units (C302, C303, C305, C308, C314, C324, C332, C336, and C339), the analysis suggests that the cumulative amount of detrimental soil conditions would exceed the 20 percent standard following timber harvest activity (Table 3-5, Soils Report, pages 19-20). 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 plus three (3) additional units (P305, P317, and P321) where short segments of existing road would be decommissioned following project activities (Table 3-5, Soils Report, pages 19-20).

There is no regeneration harvest proposed under Alternative 3. No machine piling or additional equipment travel would occur in unit C314 and the portion of C313 that make up unit H19 or in units C3327 and P340 that were originally unit H28 under Alternative 2.

The analysis predicts that all harvest units would experience an increase in detrimental soil impacts upon completion of harvest activities. It also predicts that those conditions would continue to remain at or below the LRMP standard of 20 percent upon completion of both harvest and soil restoration activities in 75 of the 76 units (Table 3-5, Soils Report, pages 19-20). One harvest unit, C336, would experience a net improvement in soil quality of approximately two (2) percent upon completion of soil restoration activities but would remain above the 20 percent standard at 22 percent of the unit with detrimental soil impacts (Table 3-5, Soils Report, pages 19-20). Detriment 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 (Table 3-5, Soils Report, pages 19-20).

There is no measurable difference between Alternatives 2 and 3 in terms of the percentage of harvested acres with detrimental soil impacts following harvest and rehabilitation activities. Approximately 14 percent of the harvest area would have detrimentally impacted soils (compacted and/or displaced). The number of acres with detrimental soil impacts associated with timber harvest activities totals 931 acres under Alternative 2 and 1,080 acres 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 (FSM 2520, R-6 Supplement No. 2500-98-1) and LRMP interpretations for Forest-wide standards and guidelines SL-3 and SL-4 that limit the extent of detrimental soil conditions (Final Interpretations, Document 96-01, Soil Productivity, 1996 as cited in the 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, 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.

Sensitive Soils - Both of the action alternatives propose mechanical harvest treatments on landtypes that contain sensitive soils in localized areas. Table 24 displays, by alternative, the proposed harvest units that contain small areas of sensitive soils by management concern category and the total number of acres affected.

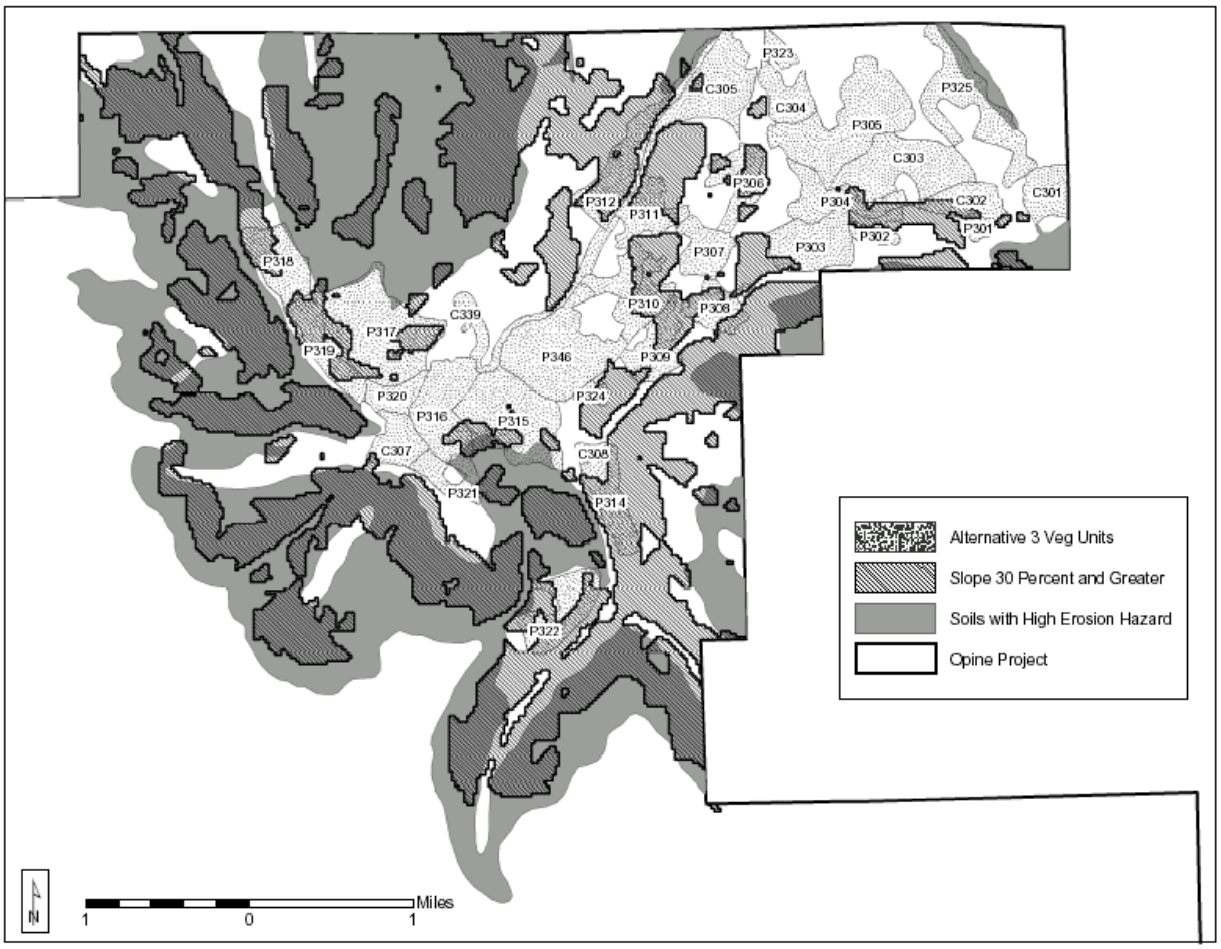
Table 24 Proposed Mechanical Harvest Units and Acres on Landtypes with Sensitive Soils in Localized Areas, Opine Planning Area (Source: Soils Report, Table 3-7, page 28).

Management Concern	Alternative 2	Alternative 3
Slopes greater than 30 percent	254 acres (total) Units: H02, H04, H07, H10, H11, H42, P01, P02, P03, P04, P06, P07, P08, P10, P11, SD01 and SD08	443 acres (total) Units: C302, C303, C305, C307, C339, P301, P302, P303, P304, P306, P308, P309, P310, P311, P312, P314, P315, P316, P317, P321, P322 and P324
Low productivity sites limited by frost heaving, low fertility and climatic factors	112 acres (total) Units: H29, H30, H34, P20 and P21	171 acres (total) Units: C329, C330, C331, C333, P341 and P343
Soils with variable depths in areas of rocky lava flows	418 acres (total) Units: H19, H22, H32, H33, H34, H37, P19 and P21	715 acres (total) Units: C314, C321, C324, C329, C330, C333, C334, C335, P335, P342 and P343
Soils with high hazard for surface erosion	12 acres (total) Units: H42, P07, P08, and P10	80 acres (total) Units: P312, P315, P316, P317, P321, P322 and P325

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. Figures 6 (Alternative 2) and 7 (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.

Figure 6 Alternative 2 Proposed Harvest Units with Overlapping Landtypes Containing Localized Sensitive Soils (from Figure 3-1, Soils Report, pages 28-29).

Figure 7 Alternative 3 Proposed Harvest Units with Overlapping Landtypes Containing Localized Sensitive Soils (from Figure 3-2, Soils Report, pages 29-30).



In order to avoid soil displacement damage, ground-based equipment would be restricted to existing roads and designated skid trails at all times, operators would be required to winch logs - trees to skidders, and logs - trees would be skidded with one end suspended above the ground. These actions would limit or reduce the potential for not only soil displacement but also increases in soil compaction. The majority of activity areas proposed for mechanical harvest are located on gentle to moderately sloping terrain where the maneuvering of equipment generally does not remove soil surface layers in areas that are at least five (5) feet in width (Soils Report, page 30).. Smaller areas of soil displacement or the mixing of soil and organic matter does not constitute detrimental soil displacement.

Restricting operations to periods of adequate soil moisture would also reduce the risk of soil displacement through wind erosion when soils are too dry and the risk of puddling when soils are too wet. .No temporary roads or new logging facilities (landings, skid roads would be constructed on sensitive soils with high erosion hazards. 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 during project implementation.

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. The potential for successful regeneration is limited by properties such as soil depth, soil fertility, and temperature extremes on low productivity sites such as frost pockets, cold air drainages, and localized areas of rocky lava flows. Under both action alternatives, all proposed harvest units currently have adequate stocking levels from past harvest treatments. This indicates that management concerns associated with these sites were successfully addressed by past silvicultural practices. With the thinning prescriptions proposed for this entry, reforestation objectives are not a major concern because adequate regeneration currently exists on these sites.

Subsoiling is proposed in some harvest units 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.

Both Alternatives 2 and 3 propose fuels reduction treatments on 19,663 acres and 17,878 acres respectively. These acres do not include any non-commercial or commercial timber harvest. Some acres include the thinning of small trees less than four (4) inches DBH (pretreatment) prior to further treatment such as prescribe burning and/or mowing. No measurable detrimental soil impacts are expects on any proposed treatment unit under either alternative from any proposed treatment activities. The risk of a high intensity and/or long duration wildfire creating hydrophobic soils, completely removing the surface organic layer, completely removing large areas of vegetation, sterilizing soils, or increasing the volatilization of nutrients would be reduced. This in turn would reduce the risk of increased wind and water erosion and reductions in soil productivity.

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 6-8 inches of vegetation after mowing would also serve to limit or eliminate the potential of measurable soil compaction or other detrimental soil disturbance. Some disturbance, primarily displacement, is possible when turning vehicles. The relatively small size and low weights associated with vehicles commonly used for mowing and burning coupled with the retention of vegetation

would serve to limit such disturbances to very small and isolated locations. The amount of disturbance would therefore be expected to be immeasurable under both alternatives.

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. Prescribe burn treatments in shrub - grassland plant communities would not be expected to cause severely burned soils or other detrimental soil conditions. These communities contain lower fuel loadings than forested sites. Prescribe burns in these vegetation types tend to be fast moving, relatively short duration events resulting in lower soil temperatures and greater retention of existing shrub and forb vegetation and loss of surface organic matter. There would be no measurable effects of such activities under either alternative.

Unrestricted motorized cross-country travel would be prohibited under Alternative 3 on 28,647 acres of the planning area outside of the East Fort Rock OHV area. Motorized use would be restricted to designated roads and trails. This would reduce or eliminate the creation of user-created travel routes. Use of existing user-created routes and non-system roads would be prohibited. Soil compaction, soil displacement, and soil erosion levels would be reduced; in the long term, these impacts would be eliminated as these sites became revegetated. The degree of improvement is unknown as there is no current, accurate inventory of user-created routes within the planning area. Assuming an average width of approximately 50 inches, one mile of user-created trail would result in the long term restoration of approximately one half (0.5) acre. No closure would be implemented under Alternative 2. Motorized cross-country travel would continue. No non-system (user-created) roads and trails would be closed to use. The potential and likelihood of new non-system roads and trails being created would remain.

Under both alternatives, the proposed harvest activities would reduce potential sources of future CWD within harvest unit boundaries and especially where mechanized whole-tree skidding is used. However, both alternatives would likely retain sufficient amounts of CWD following post-harvest activities to meet recommended guidelines of five (5 to 10 tons per acres in dry site ponderosa pine and 10-15 toms per acre in lodgepole pine. Existing snags and down woody materials would be retained on site. Harvest activities would recruit additional CWD to the forest floor through breakage of limbs and tops during felling and skidding operations. Understory trees, damaged during harvest operations, would also contribute woody materials that provide ground cover protection and a source of nutrients for maintaining soil productivity on treated sites. Additionally, meeting the minimum wildlife habitat objective requirement of 1.4 percent of the harvest unit surface area (approximately 610 square feet of CWD per acre would also meet soil resource objectives.

Fuel reduction treatments within harvest units and on other forested sites would reduce CWD and some of the forest litter by burning slash accumulations. Most of the slash generated from harvest activities 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 underburns within activity areas. If underburning is recommended to reduce fuel loadings, burning would be accomplished under controlled conditions that minimize damage to standing trees and remove only a portion of the protective surface cover. Fuel reductions achieved through planned ignitions usually burn with low-to-moderate intensities that increase short-term 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 (Soils Report, page 31). Any trees killed from prescribed burn treatments would eventually fall to the ground and become additional sources of CWD. Depending on the rate of decay and local wind conditions, many of the small-diameter trees (less than 10 inches could be expected to fall within the short-term (less than 5 years).

The management requirements and project design criteria 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 location 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 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.

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. Tables 3-4 (Alternative 2 and 3-5 (Alternative 3) in the Soils Report (pages 17-20) 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. They 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.

Monitoring of past subsoiling activities on the Deschutes National Forest has been shown to be effective in restoring detrimentally compacted soils (Soils Report, page 32). 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, page 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, page 32) under both alternatives.

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).

Proposed, Endangered, Threatened, and Sensitive (PETS) Plant Species – Appendix A of the "Biological Evaluation, Proposed, Endangered, Threatened, and Sensitive Plants, Opine Project:" lists all the plant species suspected or documented to occur on the Deschutes National Forest. 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 five years. Two (2) species, the pumice grape fern and the green tinged paintbrush, have known habitat and are documented to occur within the planning area.

There would be no measurable 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. In the longer term, multiple decades, continued tree encroachment, particularly of lodgepole pine in sites in the southern portion of the planning area, would be expected to result in a decline in the quality and distribution of the habitat through the loss of the host shrub component and resulting in a decline in the number and distribution of both plants and populations.

Long term, 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. 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 community type resulting from fire exclusion. 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 24,000 plants) of the known world population is located in the planning area As a result, this alternative provides less protection or assurance to the maintenance or sustainability of either populations or habitat. Assuming no uncharacteristic wildfire, this alternative would maintain more mid- to late-seral shrub habitat preferred by the paintbrush.

With the exception of a small population located on the southwest flanks of Pine Mountain, a wildfire would not be expected to measurably affect individuals or populations of the pumice grape fern. Most of the existing individuals and populations in the planning are located on the pumice flats near the Sand Springs BPA substation area. The pumice flats contain little or no vegetation capable of sustaining a wildfire of sufficient intensity or duration to affect those individuals or populations. Some individuals or populations located along the edges of the pumice flats and adjacent to timbered sites may be impacted by heat and/or burning trees or other vegetation falling onto individuals or into populations. The population on Pine Mountain is located in and surrounded by a shrub community capable of sustaining a wildfire. However, evidence suggests that at least some members of the genus ***Botrychium*** may be able to survive wildfires of rather extreme intensity. It is unknown if this is true for the pumice grape fern.

Continuation of unrestricted cross-country motorized travel would likely have little or no measurable impact on the green tinged paintbrush. The majority of the population in the planning area is located on Pine Mountain where slopes and other physical site conditions limit where vehicles can realistically travel. Coupled with the number of plants, approximately 24,000 in the planning area, impacts to the population are likely to be minimal and not likely to result in moving the species towards federal listing. Local populations and individuals are more likely to be affected. Motorized vehicle travel, and the establishment, continuation, and expansion of user created trails, results in the damage or loss of host shrubs and thereby reducing or eliminating individuals or populations associated with that damaged or lost vegetation.

Unrestricted cross-country motorized vehicle travel provides a greater threat to the pumice grape fern and is more likely to result in moving the species towards a federal listing. There is a much smaller population, less than 3,000 individuals, in the planning area with almost all located in the pumice flats south of Pine Mountain. The majority of these individuals are located east of FR 23 where unrestricted motorized travel would continue. Individuals and populations are more likely to be damaged or killed as a result of soil compaction or displacement resulting from vehicle travel and activities such as doing

"donuts" that displace soil and expose the below ground portions of the plant. The specific impacts of such activities are unknown as there is little or no information on the species or the impacts of various management or recreational activities on it.

Some mortality is expected to the green tinged paintbrush under both action alternatives as a result of project implementation. The extent of the loss is impossible to determine, especially in units treated with prescribe fire. This is due to 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/or oversights 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.

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 lose of viability to the population or species (BE, page 14). There are no major differences between the two alternatives as both treat approximately the same number of acres of paintbrush habitat.

Both alternatives contain populations of green tinged paintbrush within the boundaries of fuel treatment units proposed for burning (units F01-05, F07-10, F13, F17-18, F21-22, F33, and F37-39 under Alternative 2 and all the same units except F08 under Alternative 3). Additionally, a population is located adjacent to unit F11 under both alternatives and units F07, F09, and F18 under Alternative 3. Populations within treatment units would be flagged out to exclude them from the treated area. Populations on or adjacent to unit boundaries would be either included in no treatment areas or protected by moving the unit boundary. Individual plants or portions of populations located within burned areas will be damaged or killed under both alternatives although by including populations within no treat areas and moving unit boundaries to avoid adjacent populations would minimize the risk and the number potentially affected. The use of prescribe fire in either alternative would not result in moving the species towards federal listing.

Mowing is not expected to result in measurable effects on the paintbrush under either alternative. Mowing would retain a minimum of 6-8 inches of vegetation above the soil surface Incidental damage, primarily crushing or breaking the stem associated with the use of a small tractor to pull the mower, would be expected on a small portion of individual plants.

Vegetation treatments, including commercial and non-commercial harvest, and tree removal in range and sage-grouse units (Alternative 3 only) would also not be expected to result in any measurable impacts on the species population although individual plants may be damaged or destroyed during or as a result of operations. Populations would be identified, flagged, and excluded from treatment. In sage-grouse habitat enhancement units with paintbrush (SF1-3, SG9-10, and SG12-14), trees would be felled away from the populations and slash would not be piled on or in close proximity to those populations. Slash piles in close proximity to those populations would not be burned.

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. Similar impacts would be expected where prescribe fire was applied in potential but currently unoccupied habitat.

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. Some localized losses would be expected from both the wildfire and the associated firefighting efforts but they would be more localized and limited in scale and duration. Both alternatives would maintain fewer acres of the mid- to late-seral shrub habitat preferred by the paintbrush.

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.

Neither Alternative 2 nor Alternative 3 would have any measurable effect on the population, individuals, or habitat of the pumice grape fern and would therefore not contribute to a trend towards federal listing or the loss of viability to the population or species (BE, page 14). This species is primarily located in the pumice flats south of Pine Mountain. With the exception of fuel treatment unit F29 in Alternative 2, no vegetation or fuel reduction units contain any known individuals or populations. A small population located on the southwestern flank of Pine Mountain is located within the boundaries of fuel unit F29. The population would be flagged to exclude it from all proposed fuel reduction treatments and thereby avoiding any risk of damage or loss of either individual plants or the population.

Sage-grouse enhancement units SG04 and SG05 contain individuals and populations. However, there are no trees located in the areas of those individuals and populations that would be felled. Therefore, there would be no measurable effect of the treatments on either the individuals or populations in those areas.

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.

Alternative 2 would not implement an area closure to prohibit cross-country motorized vehicle use except on designated roads and trails. The effects on both species would be the same as described under Alternative 1. Alternative 3 would implement an area closure for the portion of Opine outside of the East Fort Rock OHV area. Motorized vehicles would be restricted to existing system roads only as there are currently no designated trails in this area. Non-street legal OHVs would be restricted to maintenance level I and II roads only. This would effectively eliminate all or most motorized vehicle access to all known populations of both paintbrush and pumice grape fern. This would greatly reduce or eliminate the risk and probability of plants or their habitat being damaged or destroyed by motor vehicle use.

Road closures and decommissionings would have no measurable effect in either the short or near long term on the paintbrush under either alternative. Closed roads would not be subsoiled and would therefore not likely to provide conditions suitable for re-establishment of shrub vegetation desired by the paintbrush for at least several decades. Closed roads could be reopened at some point in the future for the purpose of future management activities, further delaying or precluding paintbrush from becoming established in those areas.

Decommissioned roads would be subsoiled and are not expected to be reopened in the future. Subsoiling would help to hasten the re-establishment of native vegetation, including shrubs, thereby potentially reducing the time necessary to re-establish paintbrush on the site. However, some or all decommissioned roads could be converted to motorized or non-motorized trails at some point in the future thereby reducing the amount of potential habitat that would otherwise become available. Alternative 3 decommissions more miles than Alternative 2 (13.6 miles versus 9.7 miles). Assuming an average 14

foot wide road, Alternative 2 would potentially result in an increase of 16.5 acres of habitat versus an increase of approximately 23.1 acres under Alternative 3. The exact number of acres of potential habitat restored will depend on which roads are converted or are not converted to other uses such as trails in the future.

No roads are proposed for either closure or decommissioning within known pumice grape fern habitat under either alternative. Therefore, neither alternative would have any impact on pumice grape fern or its habitat in either the short or long term.

Noxious Weeds and Other Invasive Plants - Existing records indicate that spotted knapweed is the only species of any consequence on the current noxious weed list that is found within the planning area (Appendix *, Noxious Weed Assessment Report.). Most populations are associated with roads with distribution over large areas being linked to roads (Noxious Weed Assessment Report, page 6). The presence or distribution of noxious weeds would not be affected under Alternative 1 because no soil disturbance activities would be implemented that would create additional habitat. Alternative 1 would continue to present a moderate risk to the introduction and/or spread of noxious weeds because populations of spotted knapweed are present on Pine Mountain and vectors that contribute to the introduction and/or spread of noxious weeds, specifically livestock and OHV use, would continue. There is no evidence that livestock are spreading noxious weeds, and specifically spotted knapweed, as most populations are along roads.

The number and distribution of user created motorized vehicle trails is increasing, especially in areas outside of the East Fort Rock OHV area where cross-country motorized vehicle travel is unrestricted. 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/or species and expanding existing ones is likely to increase in both the short and long term in these areas under this alternative. The risk is lower within the boundaries of the East Fort Rock OHV area where motorized use is restricted to designated roads and trails although user-created trails continue to become established despite prohibitions against such activity.

Alternatives 2 and 3 are rated as high risk for the introduction and spread of noxious weeds. In addition to the populations of spotted knapweed on Pine Mountain, the continuation of grazing under both alternatives and continued unrestricted OHV use under Alternative 2, both alternatives would include the use of heavy equipment for timber harvest, road closures and decommissionings, and fireline construction

Little or no measurable increases in the introduction and/or spread of noxious weeds would be expected under either of the two action alternatives because the use of best management practices, appropriate contract specifications in both service and timber sale contracts, and project design criteria/mitigations. 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. 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. However, 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.

Unrestricted cross-country motorized vehicle travel in the planning area outside of the East Fort Rock OHV area would be eliminated under an administrative closure order under Alternative 3. No such order would be implemented under Alternative 2. The effects of not implementing such a closure under Alternative 2 would be the same as Alternative 1. Under Alternative 3, the risk of the introduction and/or spread of noxious weeds would be reduced. New trails would be less likely to be created and existing ones would potentially be allowed to recover, including the regeneration of native vegetation. Both would reduce the amount of disturbed soils that provide suitable habitat for noxious weeds. The closure would also reduce the number of areas accessible to motorized vehicles and thereby also reduce the potential of picking up and transporting seed or plant parts to other areas.

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 expansion of this species under both alternatives would be minimized by educating implementation crews about this species thereby allowing them to identify it and avoid activities in areas of dense patches.

Scenic Resources – 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.

Continued unrestricted OHV use outside of the East Fort Rock OHV area would increasingly affect the quality and type of recreational experience associated with scenic resources through increasing noise, dust, and increased use. Similar impacts would be expected within the boundaries of the East Fort Rock 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.

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 during winter months when snow on open ground visibly contrasts to the darker appearing cover of forested areas.

Scenic views in foreground areas along Road 2017 and adjacent to campground facilities would have visible short-term impacts from proposed vegetation management and fuel treatment activities throughout the project area. 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 design criteria, 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 5 and 6) 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. Design criteria 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. Over the long term, more than 5-10 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. This would result in reduced levels of noise and dust in addition to reduced levels of use.

The closure or decommissioning of 14 miles of system roads under Alternative 2 and 25 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/decommissionings 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. 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.

Range – 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.

The quantity, quality, and distribution of browse for wildlife would not change in the short term short of a 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.

Alternatives 2 and 3 would set back encroachment of juniper and ponderosa pine in existing shrub and grass communities; approximately 507 acres under Alternative 2 and approximately 235 acres under Alternative 3. Removal of encroaching trees would help to retain existing shrub and grass components, reduce the amount and distribution of bare soil, reduce the exposure and loss of soil to wind and water erosion, and maintain or improve vegetative diversity. Treatment actions would be expected to retard progression to forest communities for approximately 30 years (Range Report, pages 45-46).

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/or browse available for livestock and wildlife. These impacts would be expected to be short term, less than five (5) years, in duration.

In additional 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. It is expected that this treatment would remain effective, i.e. provide quality forage and browse, for approximately 30 years when retreatment would again be necessary.

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 vegetation and/or fuel reduction treatments under both action alternatives may preclude the use of one or more pastures within a given allotment for one or more grazing seasons to attain other resource objectives. This is particularly true where prescribe fire is applied and a post-burn rest is required to permit shrubs to become established. The number of acres where prescribe fire would be used either singly or in combination with other treatments is approximately the same for the two alternatives so there is little difference in the projected impacts between them. Permittees may need to find alternative areas for grazing resulting in an increase in costs. They may also need to reduce stocking levels, especially on allotments with fewer than five (5) pastures such as Pine Mountain. This could also result in increased costs in addition to reduced income and/or other economic impacts. Neither alternative has identified treatment units which would require rest after burning to meet other resource objectives.

If two or more pastures within a given allotment are treated within the same or succeeding years, permittees may also experience similar but likely larger economic impacts.

Conversely, the treatment of large areas and/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. Alternative 2 proposes only slightly more acres of mowing either as a single treatment or in combination with others, particularly burning than Alternative 3, 499 versus 442 acres.

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. Alternative 3 proposes to conduct more acres of post-

harvest fuel reduction using prescribe fire than Alternative 2 making it more likely that one or more permittees would experience impacts to their operations. Impacts are likely to affect the permittee with the Pine Mountain Allotment the most. Under both alternatives, the majority of prescribe fire units are located in the Micro and Coop Pastures. Restrictions or prohibitions on grazing in one or both pastures simultaneously or in successive years would likely result in major economic impacts to the permittee.

The permittee in the Cinder Cone Allotment would likely be the next most impacted should restrictions on grazing be implemented following prescribe fire activities because of the large number of proposed treatment acres with a prescribe fire prescription. However, impacts to the permittee would be expected to be less than that experienced by the permittee with the Pine Mountain permit. The Cinder Cone is a seven (7) pasture allotment with proposed treatments in three of the seven pastures. The permittee has more options to move livestock and schedule grazing thereby reducing the potential impacts.

The permittee with the Sand Springs Allotment would have the least impact because only a single pasture is affected and the number of acres where prescribe fire is proposed under either alternative is relatively small. The allotment is also a five pasture allotment and is proposed to go to a six pasture allotment with one of the other pastures being divided into two which would provide additional flexibility in operations.

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.

Treatments proposed in the sage-grouse enhancement units under Alternative 3 would have no measurable effect on grazing. The proposed units are largely shrub and shrub-grass communities with scattered encroaching juniper and ponderosa pine. Proposed treatments would remove all trees up to 14 inches in the juniper and 16 inches in the ponderosa pine. Where primarily small trees are removed, there would be no change in the quantity, quality, or distribution of forage species because the trees are generally of insufficient size to affect those species. Where larger trees are removed, small increases in forage would be expected several years in the future. Due to the limited number of trees coupled with the relatively wide distribution of the trees to be removed, the amount of increase would be very small.

Removal of the encroaching trees would also delay the conversion of the existing shrub and shrub-grass communities to forest communities.

No sage-grouse habitat enhancement activities would occur under either Alternative 1 or 2. There would be no measurable direct or indirect effect on grazing or forage in the short or near long term. Over the longer term, a period of several decades, continued tree encroachment would be expected to result in declines in forage quality, quantity, and distribution. Existing shrub and shrub-grass communities would continue to decline in area and distribution and the amount of forest and forested shrubland would increase.

Road closures and decommissionings would have little or no measurable impacts on grazing or grazing operations under either Alternative 2 or 3. Roads proposed for closure or decommissioning do not

currently provide access to existing water sets or other grazing facilities. 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 decommissionings including the use of horses or OHVs.

Possible conflicts between grazing and vegetation and fuel reduction treatments 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 would be reduced by implementation of the design criteria 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.

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 and specific management actions..

Recreation – 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 user created trails would continue to be utilized for both motorized and non-motorized access. The existing approximately 81 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 area. 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 degrading 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 user created 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 East Fort Rock OHV area, this also occurs within that area but at a reduced rate.

Under 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 decommissionings 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 and/or Pine Mountain Campgrounds.

Table 25 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.

Proposed vegetation and fuel reduction treatments would have limited short term impacts on developed camping at the Pine Mountain Campground. Propose 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 under regrowth of vegetation obscured this evidence. Design criteria, 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 FR18, 23, 25, and 2017 would also travel through or adjacent to other proposed treatment units under both alternatives. Again, design criteria 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 design criteria would be expected to keep those impacts to a minimum. Long term impacts would be similar to those describe for the Pine Mountain Campground.

Table 25 Developed and Dispersed Recreation Sites within or adjacent to Treatment Units by Geographic Area and Alternative, Opine Planning Area (Modified from Table 4, Recreation Report, pages 9-10).

Treatment Type	Geographic Area	Alternative 2	Alternative 3
		Treatment Unit & Recreation Site Type	Treatment Unit & Recreation Site Type
Vegetation	Pine Mountain	Unit 04 – 1 dispersed campsite Unit SD08 – 3-4 dispersed campsites Unit P09 – 3 dispersed campsites Unit P10 – Pine Mountain CG	Unit C303 – 1 dispersed campsite Unit C304 – 1 dispersed campsite Unit C307 – 2 dispersed campsites Unit C308 – 1 dispersed campsite Unit P304 – 1 dispersed campsite Unit P309 – encompasses a large portion of a hang glider launch site Unit P315 – 2 sites Unit P321 – Pine Mountain CG Unit P346 – 4 dispersed campsites
	Sand Springs	Unit 34 – 1 dispersed campsite Unit 36 – 1 dispersed campsite Unit 36 – 1 dispersed campsite.	Unit C330 – 1 dispersed campsite C332 – 1 dispersed campsite C333 – 1 dispersed campsite C334 – 1 dispersed campsite P342 – 1 dispersed campsite
	Tepee Draw	Unit 12 – 1 dispersed campsite Unit 14 – 2 dispersed campsites Unit 15 – 2 dispersed campsites Unit 27 – 4 dispersed campsites Unit – P15 – 1 dispersed campsite Unit P18 – 3 dispersed campsites Unit SD06 – 1 dispersed campsite	Unit C 309 – 1 dispersed campsites Unit C315 – 1 dispersed campsite Unit C325 – 3 dispersed campsites Unit P333 – 1 dispersed campsite Unit P334 - 3 dispersed campsites 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 Unit F09 – 1 dispersed campsite Unit F16 – 2 dispersed campsites along Road 2017, Pine Mountain Campground & hang glider launch site Unit F17 – 2 dispersed campsites Unit F18 – 1 dispersed campsite Unit F37 – 1 dispersed campsite Unit F38 – 1 dispersed campsite	Unit F01 – 1 dispersed campsite Unit F09 – 3 dispersed campsites, portion of hang glider launch site Unit F17 – 3 dispersed campsites, hang glider launch site & Pine Mountain Campground Unit F18 – 1 dispersed campsite Unit F35 – 5 dispersed campsites along Road 2017 Unit F37 – 1 Dispersed Campsite Unit F38 – 1 dispersed campsite

Treatment Type	Geographic Area	Alternative 2	Alternative 3
		Treatment Unit & Recreation Site Type	Treatment Unit & Recreation Site Type
	Tepee Draw	Unit F03 – 4 dispersed campsites Unit F05 – 3 dispersed campsite Unit F13 – 13 dispersed campsites Unit F15 – 1 dispersed campsite Unit F20 – 1 dispersed campsite Unit F21 – 17 dispersed campsites Unit F25 – 1 dispersed campsite Unit F26 – 1 dispersed campsite Unit F28 – 2 dispersed campsites Unit F29 – 5 dispersed campsites	Unit F03 – 4 dispersed campsites; Unit F05 – 1 dispersed campsite Unit F13 – 5 dispersed campsites Unit F15 – 1 dispersed campsite Unit F20 – 1 dispersed campsite Unit F21 – 17 dispersed campsites Unit F25 – 1 dispersed campsite Unit F26 – 1 dispersed campsite Unit F29 – 5 dispersed campsites
	Lavacicle	Unit F32 – 2 dispersed campsites	Unit F32 – 2 dispersed campsites.

Both alternatives propose fuel reduction treatments, specifically prescribe fire that include or are adjacent to current launch sites for hang and paragliders. Para and hanggliding 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 to occur later in the spring through the early the 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 decommissionings would eliminate motorized access to ** sites under Alternative 2 and ** sites 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 FR 2017-300 and 2017-350, is prohibited due the presence of fine fuels (tall grasses) in and adjacent to the road prism.

Alternative 3 would also prohibit motorized cross-country travel and close all non-system roads and trails to motorized use. This would eliminate authorized motorized access to all dispersed sites except those accessed by open system roads. Alternative 2 would not prohibit motorized cross-country travel or close non-system roads and trails. Except for sites located on or adjacent to closed or decommissioned roads, the remaining ** sites 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.

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.

Off Highway Vehicles (OHV) – Alternative 1 – No Action, would have no measurable direct or indirect effects on OHV use within the planning area. No existing trails or routes, facilities, structures, or infrastructure within the East Fort Rock OHV area would be impacted by vegetation or fuel reduction activities. There would be no need to close roads or trails to use to protect riders during periods of management activities. No roads would be closed or decommissioned thereby retaining existing mileage of roads open to OHV use. No decommissioned roads would be available for conversion to OHV trails.

There would be no change in the current open unless posted closed policy regarding motorized cross-country travel. Approximately 28,647 acres outside of the East Fort Rock OHV area would remain open to unrestricted OHV use where not otherwise restricted or prohibited by law or regulation.

East Fort Rock OHV Area - Alternatives 2 and 3 propose vegetation treatments within and adjacent to designated OHV routes within the boundaries of the East Fort Rock 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 unauthorized 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.

Equipment, falling trees, and burning can damage or destroy signs, barriers, fences, and other facilities and infrastructure. Design criteria would minimize the risk that management activities would result in significant damage to existing facilities under both action alternatives. This would include the repair 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 OHV 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.

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. Design criteria 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. Design criteria

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.

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 design criteria 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.

The closure and decommissioning of roads within the boundaries of the East Fort Rock OHV area would not have any direct or indirect effects on 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 road open to OHV use under either alternative.

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 OHV use in those areas. During low snow years when browse is likely to be more readily available, OHV use may be limited or prohibited in and the need to prevent or limit harassment of deer likely to be less critical.

Implementation of proposed vegetation and fuel reduction treatments within the East Fort Rock 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 an increase in unauthorized use such as traveling off designated routes. This risk would be minimized by implementing the design criteria 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 East Fort Rock OHV Area - Outside of the East Fort Rock 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 impact on them.

Street legal OHVs would continue to be able to drive any open system road; non-street legal OHVs would be restricted to maintenance level II roads only Vegetation management and fuel reduction activities would be expected to reduce road use and access under both Alternative 2 and 3 because access to treatment units would be prohibited during periods of operation. Non-street legal OHV use would face the greatest restrictions because closures would, in general, preclude access beyond treatment units if it required travel on a road with a maintenance level of III or higher. This would be ameliorated to some extent depending on the area under Alternative 2 because the closure of this area to motorized cross-country travel would not be implemented and all OHVs could simply drive around the treatment unit. Alternative 3, which implements the closure, be much more likely to restrict OHV travel and increase the risk and probability of unauthorized OHV use such as cross-country travel or riding through closed areas.

An area closure order would not be implemented under Alternative 2 and motorized cross-country travel would continue, making it easy for riders to easily create new routes increasing the potential and risk of riders being in or adjacent to treatment units during periods of management activity. Alternative 3 would implement the area closure restricting OHV use to designated routes (roads and trails). Because there are no designated trails in this portion of the planning area, OHV use would be limited to open system roads only with non-street legal OHV use limited to maintenance level II roads only. All user-created roads and trails would be closed. Access to treatment units during management activities would be more easily controlled with fewer legal entry points.

Implementation of the area closure may also result in greater impacts to riders than would be expected with the boundaries of the East Fort Rock area. Closures imposed during periods of management activities would likely eliminate OHV use in areas beyond the closure and could potentially trap or otherwise isolate users and not allow them legal access to legal roads. This would be more of a problem for non-street legal OHVs which are restricted to level II maintenance level roads because they cannot legally travel on other system roads except for designated shared use roads. This could and would 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 East Fort Rock system would impact OHV use and activity in this area. All the roads proposed for closure and decommissioning under both Alternatives 2 and 3 are maintenance level II roads. When combined with the area closure, this would effectively eliminate motorized vehicle access to areas accessed by these roads. However, the road identified road segments are 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 decommissionings because these are the class of road that is open to this group of OHVs outside of shared use roads.

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 East Fort Rock OHV area discussion under both alternatives.

Implementation of vegetation and fuel treatments in the area outside of the East Fort Rock OHV area would be expected to result in an increase in OHV use, particularly under Alternative 2. 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. This is less likely under Alternative 3 because the area closure would prohibit OHV use off of designated routes (roads and trails).

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 user created roads and trails coupled with communications between riders and 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 East Fort Rock, others would be expected to move to areas further to the south and/or east where areas are open OHV use. These riders seek a very dispersed recreational opportunity that they would not find in an area such as East Fort Rock.

Displacement of riders that wish to travel cross-country would be expected to put more riders into increasingly smaller areas. This would be expected to result in greater impacts in those areas that remain open to OHV use.

Consequences Relative to Significance Elements

The Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) define the word "significantly" as used in NEPA. The 11 elements of the definition are critical to reducing the paperwork through the use of a finding of no significant impact when an action will not have a significant effect on the human environment and is therefore exempt from requirements to prepare an environmental impact statement (EIS).

A. *Context.* … the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting … in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

As discussed in more detail in the following discussion associated with the other elements of significance, the context of this proposal is limited to the locale of the Opine planning area and adjacent public and private lands. In the local context, this proposal would not pose significant short- or long-term effects. This proposal is comparable to other similar proposals developed and implemented in the dry ponderosa pine and xeric shrublands on the east side of the Bend-Fort Rock Ranger District. The projected effects of the proposal are limited to a relatively minor level for wildlife and other natural resource values and uses. Mitigations included in this proposal minimize and avoid adverse impacts to the extent that such impacts are almost undetectable and immeasurable, even at the local level. Adoption of forest plan amendments to address mule deer cover needs recognizes the fact that physical and environmental conditions within the planning area are generally incapable of sustaining LRMP cover levels as described in the Deschutes National Forest LRMP. Retaining 20 percent of each treatment unit in untreated patches, adjustments in thinning and fuel treatment prescriptions, modifications to unit boundaries, and elimination of treatments from critical areas and habitats are expected to minimize the reductions in both thermal and hiding cover resulting from both vegetation and fuel reduction treatments. The resultant stand densities are more reflective of biologic capabilities and less subject to extreme events such as bark beetle attack and intense wildlife that would reduce cover levels below those expected after treatment. Impacts are further mitigated by road closures and decommissionings, a seasonal closure of system roads during critical winter months, and implementation of an area closure to motorized travel outside of the East Fort Rock OHV area until the LRMP is amended to implement a forest-wide change in OHV use.

B. *Intensity*. …the severity of impact … more than one agency may make decisions about partial aspects of a major action.

1) **Impacts may be both beneficial and adverse. A significant effect may exist even if, on balance, effects are believed to be beneficial.**

All three alternatives pose both beneficial and adverse impacts but none are significant, even separately.

2) **The degree of effects on public health or safety.**

Fire and Fuels – Under Alternative 1, No Action, no defensible corridors would be created. No defensible spaces would be created around high value resources and facilities such as the Pine Mountain Observatory, electronic sites, or the BPA substation. There would be either a lack of or a reduction in the number of escape routes and safety zones. During extreme wildfire events, the risk of escape routes being blocked would be quite high. The potential for members of the public or fire crews becoming trapped, injured or killed would remain high. The potential for an extreme wildfire event reaching and damaging or destroying facilities or other high value resources would remain high.

Both action alternatives reduce or avoid adverse impacts to public safety by locating fuel reduction units along popular roads and adjacent to important facilities including the Pine Mountain observatory, the electronic sites on Pine Mountain, and the Sand Springs BPA substation. Both alternatives maximize the number of escape routes and safety zones. Alternative 3, because it treats fewer acres along primary access routes, 10 miles of defensible space created versus 13 miles created under Alternative 2, does provide a slightly greater risk to both fire fighters and the public should a wildfire occur. Alternative 3, because it does not treat areas on the southwest flank of Pine Mountain, does increase the risk of an intense wildfire reaching the Pine Mountain Observatory.

Fires have the potential to generate large quantities of smoke and particulate matter. Table ** displays the projected quantities of PM10 particulate generated by wildfires and management actions under each alternative.

The No Action Alternative would result in no change in particulate levels and therefore no change in air pollution levels until a wildfire occurred. A wildfire would generate much greater levels of particulates thereby increasing pollution levels for a period of several days or weeks. Smoke and particulates would be more likely to reach populated areas, high use areas, or enter Class I airsheds such as wilderness areas and national parks because the timing, location, and conditions under which a fire would occur cannot be controlled.

Alternatives 2 and 3 would reduce the amount of air pollution as measured by levels of particulate matter produced by wildfires. In the short term, the use of prescribe fire would increase particulate levels during periods of burning. Such increases would be expected to occur yearly for a period of a decade or more but would result in reduced particulate levels and reduced air pollution should a wildfire occur. Impacts to local communities would be limited because burning windows would limit both the quantity of fuel burned and the conditions under which burning would occur. Because of the conditions and limitation under which controlled burns would be implemented, the amount of particulate generated by these types of fires would be less than that generated by a wildfire burning under more extreme conditions. Smoke and particulates would be less likely to reach populated areas such as Bend, high use areas, or Class I airsheds.

Implementation of fuel reduction activities, particularly mechanical treatments such as mowing and the use of prescribe fire, under both action alternatives would also not measurably affect public safety. Roads and trails within or adjacent to treatment units would be signed and/or closed to public use during periods of operation. There would be no impacts on public safety under Alternative 1 because no activities would be implemented.

3) Unique characteristics of the area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

There are no measurable direct, indirect, or cumulative effects identified for any historic or cultural resources under any of the three alternatives. No historic sites are located within the planning area. Under Alternative 1, No Action, no known or unknown sites would be affected. Because no fuel reduction activities would occur, future wildfires would likely be of greater intensity. Such fires are more likely to result in damage or loss of sites and/or data from both known and unknown sites. Fire control activities would be expected to require the use of equipment such as bulldozers to construct fireline thereby increasing the probability of unknown sites be exposed, damaged, and/or destroyed during control activities (Fire and Fuels Report, page **).

Under Alternatives 2 and 3, all known cultural resources would be avoided thereby avoiding direct, indirect, and cumulative effects on those sites. Unknown historic or cultural resources discovered during implementation of proposed activities under both alternatives would be protected or damage minimized through avoidance, site evaluation, and/or data recovery. In fuel treatment units proposed for the application of prescribe fire, unknown sites would be protected by the use of cool burns (temperatures of 400 degrees F or less) and burning during periods of higher fuel moisture content. The risk of damage or loss to both known and unknown sites would also be reduced because the risk of high intensity wildfires would be reduced. Control of any that did ignite would be more likely using hand crews and tools, further reducing the potential for damage or loss to unknown sites (Fire and Fuels Report, page **) .

There would be no measurable direct, indirect, or cumulative effects on parklands, prime farmlands, wild and scenic rivers, inventoried roadless (RARE II) areas or wilderness areas under any of the alternatives. There are no parklands, prime farmlands, wild and scenic rivers, inventoried roadless areas, or wilderness areas located in or adjacent to the planning area. The nearest wild and scenic river segment is the Deschutes River, approximately 17 air miles west of the western boundary of the planning area. Newberry National Volcanic Monument, which also contains the nearest inventoried roadless area, is located approximately six (6) to 10 air miles to the west and southwest of the planning area. The nearest designated wilderness is the Three Sisters Wilderness, located approximately 35-40 air miles to the west.

There would be no measurable direct, indirect, or cumulative effects on wetlands, streams, or other permanent water bodies under any of the alternatives. There are no wetlands, perennial streams, or other permanent water bodies within the planning area. There are no 303(d) listed bodies of water within or adjacent to the planning area. The nearest 303(d) listed body of water is the Deschutes River, approximately 17 air miles to the west. There are three (3) natural springs within the planning area boundary – Sand Springs and Pumice Springs (2). All through are current fenced to exclude livestock. Neither action alternative proposes actions within or adjacent to these areas.

The only ecologically critical areas within the planning area are the pumice flats surrounding the BPA substation in the Sand Springs area. These areas are associated with the Newberry ash plume and contain approximately 11.5 percent of the currently known world population of the pumice grape fern. None of the alternatives would have any measurable direct, indirect, or cumulative effect on individuals or populations located on the pumice flats because no proposed activities are located on these soils. A temporary increase in habitat may result where timber harvest and/or fuel reduction treatments reduce overstory canopy cover and created suitable habitat. It is unknown if new plants would become established before overstory cover returned and made the habitat unsuitable for the grape fern.

4) The degree of controversy over environmental effects.

Legitimate controversy under environmental law must be based on credible scientific evidence. There is some level of scientific controversy regarding the need for thermal cover. Deer are in a negative energy budget through the winter and require fat reserves to sustain them. Deer that enter the winter period with good fat deposits are more likely to survive harsh winters. Furthermore, anything that reduces energy use by deer is likely to result in an increased chance of survival. The primary factors that affect deer survival include:

1) Summer and winter range forage conditions;

2) Disturbance levels including domestic dogs, humans, and vehicles; and

3) Predators including poachers and hunters (Opine Project: Vegetation and Natural Fuels Management LRMP Amendment Proposal (Amendment Proposal), page 18).

Thermal cover may be more critical to deer survival during winters that are unusually cold or with deep, crusted snow layers. Thermal cover provides dual benefits to deer; reducing the direct effects of cold, and reducing the depth of snow beneath the forest canopy and thereby providing better access to browse species in the understory. However, recent studies on the value of thermal cover to wintering elk have suggested that it (thermal cover) is not essential to elk survival. This may be due in part to the fact that elk have a larger body mass and a greater ability to find browse in deeper snows than deer. There are some studies that suggest that deer are better at surviving extremes of cold than heat (Amendment Proposal, page 18). This is augmented by examples of healthy deer populations in habitats that do not have coniferous tree thermal cover available to them – grassland/plains, desert, sagebrush, and chaparral habitats. Mule deer occupy weather extremes ranging from Alberta winters to Chiluahua summers suggesting that "… special kinds of thermal cover are unimportant if available forage provides sufficient metabolizable energy (Amendment Proposal, page 18)."

Hard winters have a significant impact on deer populations. Research has shown that thermal cover may make a difference during harsh winters with deep snows because forest canopies reduce snow depths and improve access to critical browse resources. However, many of the studies were done in more mesic environments. Observations in the Opine planning area have noted that heavy canopied forest have very poor browse in the understory with bitterbrush and other browse and forage species being more robust in openings. It has also been noted in the past that winter range on the Deschutes is more heavily utilized during mild winters with heavier snows driving deer on to lower elevation lands (Amendment Proposal, page 19). A study conducted by ODFW in the Silver Lake area noted that mule deer utilized heavy canopied juniper stands during extremes of weather and did not use those same stands at other times because they lacked forage (shrub and herbaceous) resources. The study further noted that 80 percent of the deer utilized only 25 percent of the plant communities (Amendment proposal, page 19). This suggests that on the Deschutes National Forest winter range, including the Opine planning area, forage (both herbaceous and shrub) resources are more critical than cover (Amendment proposal, page 19).

Under Alternative 1, no treatments of shrub vegetation would occur. As a result, more shrub communities would move into late seral stages. Although these shrubs would be more likely to rise above the winter snows, they would also provide lower quality nutrition as they become more decadent. Deer would require more forage resources to obtain the same nutritional benefits of younger shrubs. Under Alternatives 2 and 3, both vegetation and fuel reduction treatments would move relatively retard the movement of shrub communities into late seral stages. In the short term, this could result in a decrease in available browse, particularly bitterbrush. However, because of the mosaic treatment pattern created within units coupled with the landscape level mosaic of treated units on the landscape, there would be greater diversity across the planning area. In the longer term, the addition of new shrub vegetation, particularly bitterbrush, mule deer would likely have greater quantities of higher quality forage species, both shrubs and herbaceous, resulting in a higher probability of going into winter months with more fat reserves.

The Oregon Department of Fish and Wildlife (ODFW) and the U.S. Fish and Wildlife Service (FWS) have been cooperating agencies throughout this analysis. ODFW has had full involvement through all aspects of this analysis and contributed significantly to issues involving wildlife and wildlife habitat and particularly with mule deer winter range including cover and browse availability. ODFW has argued that proposed actions will reduce cover and available browse (bitterbrush) thereby placing the wintering deer herd at risk unless other actions, specifically road closures, are implemented to minimize the impact of the vegetation (both harvest and fuel reduction) treatments. Their input contributed to the addition of seasonal road closures, road closures and decommissionings, and the area closure to off-road vehicle use to mitigate the effects of the vegetation and fuel reduction treatments on deer thermal and hiding cover.

The FWS contributed significantly to issues concerning the greater sage-grouse and sage-grouse habitat. They argue that there are opportunities to do more to maintain and/or enhance habitat for the species in the planning area.

Public involvement efforts identified no other significant controversies regarding the environmental effects of this proposal or the alternative.

5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

Actions proposed under both action alternatives have been and are continuing to be implemented in similar conditions in areas adjacent to the Opine planning area and elsewhere on the Bend-Fort Rock Ranger District and Deschutes National Forest. The effects predicted by this analysis are similar to those identified in those other projects. Monitoring conducted during and after the implementation of similar projects has found neither highly uncertain impacts to the human environment nor have they involved any unique or unknown risks.

6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

None of the alternatives analyzed here, nor any of their individual parts, would establish a precedent for future actions. They also do not represent a decision in principle about any future considerations.

7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

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.

Wildlife Habitat – All or portions of three grazing allotments – Cinder Cone, Pine Mountain, and Sand Springs – are located within the Opine planning area boundaries. Grazing was reauthorized in the Cinder Cone and Pine Mountain Allotments with the signing of the *Cinder Hill Range Allotment Environmental Assessment* in July, 2004. It also authorized the construction of new fences, establishment of four (4) new water sets in the Cinder Cone Allotment located in the Opine planning area, changed grazing seasons, and increased the size of the Cinder Cone Allotment, including increasing the number of pastures.

The Sand Springs Allotment is currently being analyzed to reauthorize grazing and the construction of additional improvements including new water lines, water sets, and fences with a decision expected during the late summer or fall of 2005 (Cluster II Range Allotment Environmental Analysis).

The Cinder Hill EA determined that adjusting seasons of grazing, increasing the number of pastures in the Cinder Cone Allotment, use of rest-rotation grazing, and moving livestock when utilization standards were met would not result in the loss of available browse for mule deer from livestock browsing on bitterbrush. There would be no measurable cumulative effect on bitterbrush availability when considering grazing in combination with any of the three alternatives, and specifically with either Alternative 2 or 3.

Grazing within the Pine Mountain Allotment has the potential to affect sage-grouse, particularly during nesting and early brood rearing periods. No impacts were identified when grazing was controlled by the

placement of water sets that resulted in livestock remaining away from nesting habitat during nesting season. No measurable cumulative effects would be expected in combination with any of the three Opine alternatives.

Domestic livestock do reduce the availability and distribution of grasses and forbs through browsing. Such impacts tend to be localized and random in occurrence. Loss of grasses and forbs due to foraging by livestock reduce cover and food for ground dwelling and nesting species, including the greater sage-grouse. Grazing in fuel reduction units treated by prescribe fire would likely result in a larger short-term decrease (one growing season or less) in such vegetation than that expected from either grazing or burning alone. However, the reduction in competition resulting from the use of fire would result in an increase in the quality and quantity of grasses and forbs for a number of years until shrub and/or tree competition resulted in reductions in quality and quantity. Monitoring stubble heights and removing livestock when standards were met would be expected to limit impacts to ground dwelling and/or nesting species. There would be no measurable cumulative effect under any of the three alternatives.

Water sets result in the loss of habitat through the reduction in or complete loss of vegetation. The scale is limited; approximately one (1) acre per water set. Conversely, water sets, at least during the time during which they are utilized, provide an important source of water on a landscape with little or no permanent water sources. There is no measurable cumulative effect on wildlife or wildlife habitat under any of the three Opine alternatives.

Fences would continue to restrict the movement of at least some species of wildlife, particularly larger animals. Fences requiring removal or repair would continue to increase the risk of wildlife becoming entangled and either becoming injured or killed. Removal of unneeded fences and either removal or replacement of those requiring repair would reduce or eliminate the risk. New fences would be wildlife friendly allowing easier movement through the fence and reducing the risk of an animal becoming injured or entangled and dying.

Expansion of facilities and the application of a vegetation management plan to control vegetation to maintain telescope views and reduce the risk of loss or damage to facilities from wildfire within the boundaries of the Pine Mountain Observatory special use permit area would have no measurable cumulative effect on wildlife or wildlife habitat under any of the three alternatives. Less than one acre of vegetation would be lost to the construction of new structures and related infrastructure and facilities. Vegetative cover, particularly tree cover and specifically existing large diameter, yellow bark, older ponderosa pine would be retained. Understory tree and shrub components would be thinned, and over time, would be retained at lower stocking levels that would reduce the risk of a severe, high intensity wildfire and would help to retain habitat conditions for species that favor such habitats. Expansion of the permit area from the current approximately four (4) acres to approximately nine (9) acres, would also be expected to have no measurable cumulative effect. Although the expansion of the permit area would allow for the future development of new facilities, such additional development would require additional analysis and decision or decisions. Until such developments were proposed, only vegetation management activities to maintain telescope views and reduce the risk of wildfire would be conducted.

Continuing planning efforts in adjacent areas would be expected to continue the current trend of closing and/or decommissioning system roads. This would be expected to reduce habitat fragmentation, reduce disturbance levels, restore habitat effectiveness, improve the movement of wildlife, and restore vegetation under all alternatives. Cumulatively, Alternative 1 would provide the least level of improvement as no roads would be closed or decommissioned. Alternative 3 would provide the greatest improvement because it closes or decommissions the greatest number of miles of road.

In the short term, the more miles of road decommissioned by subsoiling, the greater the risk of the introduction and/or spread of noxious weeds and the loss or degradation of wildlife habitat quantity and quality. Long term, the risk of the introduction and/or spread of noxious weeds would be reduced thereby resulting in both the quantity and quality of wildlife habitat improving.

With the exception of the East Fort Rock OHV area, areas adjacent to the Opine planning area are currently open to unrestricted motorized (OHV) cross-country travel. It is expected that a forest plan amendment will be proposed and implemented within the next five years that would restrict motorized travel to designated roads and trails and eliminate unrestricted motorized cross-country travel. The effect of this action would be similar to that associated with the associated with the area closure proposed under Alternative 3. Under Alternatives 1 and 2, OHV use and the associated impacts would continue until the amendment was adopted and implemented; at least three to five years. Under Alternative 3, the amendment would supercede and vacate the closure order; the impacts would have been experienced during the closure period. No additional impacts would be expected but recover of habitat would be at least 3-5 years ahead of the other two alternatives. Where OHV use is permitted to continue, such use would continue to result in the loss of vegetation where trails, trailheads, campsites, and other use areas are located. Habitat effectiveness would continue to be limited or eliminated in those areas. Where such use was either reduced or eliminated, vegetation would be expected to recover resulting in a slow increase in habitat quality, quantity, and effectiveness.

Restoration of user-created trails would be expected regardless of alternative but contingent upon funding and personnel. Such activities would be expected to result in improve habitat quality, quantity, and effectiveness over the long term.

Non-motorized trails, including those used for hiking, mountain biking, and trail riding, also result in the loss of native vegetation associated with the trail tread, trailheads, and other developments. Use, depending on the season of use and the specific species, could result in the disturbance of wildlife resulting in nesting failure, unnecessary expenditures of energy, and other harassment.

Most use is currently associated with existing motorized trails as there are no developed non-motorized system trails in the Opine planning area. A hiking trail, approximately two (2) miles in length, has been proposed for the area around the Pine Mountain Observatory. Because of the limited length of the trail, the elevation of the proposed trail, and the expectation that the majority of users would be visiting the observatory primarily during the period between Memorial Day and Labor Day each year, the level of cumulative impact would be expected to immeasurable irrespective of which alternative is selected. No other trail developments are currently expected within the planning area or in any adjacent areas.

Construction of new developed recreation facilities such as campgrounds is not foreseen within or adjacent to the planning area. The Sand Springs campground site is proposed for upgrading within the currently impacted area. This would have no measurable cumulative effect on wildlife or wildlife habitat under any of the three Opine alternatives as past use has resulted in the loss of vegetation and limits the use of the area by wildlife species, especially when the area is utilized by campers or OHV riders. No improvements are proposed for the Pine Mountain Campground and therefore there would be no additional cumulative effects on wildlife associated with that site under any of the alternatives.

Portions of two existing OHV trails within the boundaries of both the Opine Planning Area and the East Fort Rock OHV area are proposed for relocation. No net change (increase or decrease) in the number of miles of trail over current levels is projected. Effects on wildlife habitat and wildlife would be relocated from the current locations to the new locations. No measurable cumulative effect on wildlife or wildlife habitat would be expected.

The development of additional OHV facilities, including trailheads, staging areas, and play areas, are or may be proposed within the boundaries of the East Fork Rock OHV area. Further development of existing facilities, particularly trailheads and staging areas is or may also be proposed. Such developments would be expected to increase the number of people utilizing those sites and thereby increase the amount of use on surrounding trails. This would likely increase the risk and level of harassment and/or displacement of wildlife, could increase the loss of vegetation thereby reducing habitat quality, and result in increased habitat fragmentation. Past history suggests that such increased use could be expected to result in the increase in the number and distribution of user created trails resulting in further losses of habitat, increased habitat fragmentation, and an increase in the risk of harassment and/or displacement.

The increase and distribution of user created trails would be expected to be lower and impacts to wildlife and wildlife habitat lower within the boundaries of the East Fort Rock OHV area when compared with areas outside of the OHV area due to the limitation of use to designated routes. Implementation of the proposed closure of the remainder of the Opine area to unrestricted cross-country OHV use under Alternative 3 would be expected to result in similar impacts to wildlife and wildlife habitat within and outside of the OHV area within a year of a decision. Under Alternatives 1 and 2, the restriction of OHV use would not occur until a forest plan amendment was adapted and implemented, three to five years or longer in the future. During that time period, continued OHV use and development of user-created trails would continue to fragment habitat, reduce habitat effectiveness, reduce habitat quantity and distribution, and continue a higher level of risk of harassment and displacement

Implementation of a forest-wide forest plan amendment to restrict OHV use to designated roads and trails would have similar impacts to wildlife in areas adjacent to the Opine planning area. Until such an amendment is implemented, impacts to wildlife and wildlife habitat in those areas would be expected to be similar to those described for the Opine area currently open to unrestricted OHV use under Alternatives 2 and 3 with the impacts expected in the same timeline. Longer term, the forest plan amendment would result in the development of additional facilities – trailheads, staging areas, and play areas – and designated routes. Impacts to wildlife would be expected to be similar to those described previously for areas with those types of facilities and activities.

There are at least 89 known dispersed recreational sites within the planning area. Many of these are associated with historic or existing water set locations, log landings, and other resource management activity sites. Continued use of these sites would have no measurable cumulative effect under any of the three alternatives. Habitat would continue to be degraded or non-existent for most species due to the loss of vegetation, soil compaction, and human use. Some improvement in habitat quality and distribution may result from road closures and/or decommissionings making sites inaccessible to motorized vehicles and resulting in decreased use. This may result in displacement of those activities to other sites. The relatively small size of these sites, one acre or less, has little measurable impact across the planning area although localized areas may see a large increase in the amount of area impacted from displacement.

The BPA substation and associated transmission line rights-of-way would continue to provide limited or no wildlife habitat under all three alternatives. Alternatives 2 and 3 would treat small areas immediately south of the transmission line right-of-way resulting in the removal of some existing forest cover but would not increase the area of early seral habitats with few or no tree cover. Species preferring less dense forest habitats and edge habitats would be expected to favor the more open conditions in the short term but would be expected to return to pretreatment levels within 2-3 decades as tree cover and density increased. The relatively limited treatment area would not be expected to result in measurable population increases above existing natural levels. No treatment would occur under Alternative 1 and no change in habitat or population levels would be expected beyond natural or normal variation.

Other facilities and infrastructure such as microwave sites and utility lines and corridors (powerlines to microwave sites, Pine Mountain Observatory, etc.), would continue to eliminate or modify vegetation and thereby eliminate, modify, or restrict wildlife habitat and habitat usage. The limited scale, less than 5-10 total acres within the planning area, has no measurable effect on wildlife habitat or wildlife under any of the three alternatives.

Firewood cutting would be expected to continue under all three alternatives. Alternatives 1 and 2, because they do not initiate a closure of the area outside of the East Fort Rock OHV area to motorized cross-country travel, would expect to see a continuing reduction in snag and downed wood habitat across the landscape. Imposition of the closure under Alternative 3 would reduce the loss of snag and downed wood habitat beyond 300 feet from roads. Loss of these habitats, especially downed wood habitats, would be expected to accelerate within 300 feet of roads under Alternative 3 due to the increased pressure resulting from concentrating people in those areas rather than dispersing them within a larger area. This pressure would likely be further aggravated by road closures and decommissionings.

It is unknown at present if stand culturing activities beyond those proposed in either Alternative 2 or 3 would be implemented in other forest stands within the planning area. Future planning efforts, primarily to the south and southwest of the Opine area, are likely to propose such activities. Thinning, pruning, and reforestation/regeneration across large areas with large treatment acres would modify habitat creating conditions favorable to some species and unfavorable to others. Wildlife species may be displaced or forced to alter travel, nesting/breeding, and/or foraging patterns and areas.

Grazing would continue on BLM and private lands to the north and east of the project area. All known sage-grouse leks are located on BLM lands in either the Kotzman Basin south and southeast of Pine Mountain or in the Millican area north and northwest of Pine Mountain. Depending on the timing and intensity of grazing, this has the potential to affect the breeding success of sage-grouse and reducing the number of birds nesting on Pine Mountain within the planning area. Assuming that grazing practices on BLM managed lands, and to a more limited extent on intermixed private lands, continue to follow existing practices, there would be no measurable cumulative effect under any of the three alternatives.

The BLM has restricted OHV use within the Millican area to reduce impacts to the leks and sage-grouse. The proposed resource management plan would result in additional restrictions to OHV use including the maintenance of seasonal closures and the reduction in the number of miles and locations of trails. No such plans are known to exist for sage-grouse habitats on the east side of the planning area (primarily east and southeast of Pine Mountain). Assuming that the proposed plan is accepted and implemented with the proposed OHV changes, it is reasonable to expect that some habitat improvement would occur and there would be some potential increase in population numbers.

Hunting of sage-grouse would likely continue. Hunting seasons and bag limits are established and managed by ODFW. Evidence suggests that birds utilizing the leks around Pine Mountain and nesting on Pine Mountain travel to the area from sites farther east where hunting of the species is permitted. Continued hunting has the potential to reduce the number of birds that could or would travel to the Opine area to nest and raise young and could result in the reduction of the local population.

Wildfire and fire suppression would continue on all ownerships. Without vegetation and fuel reduction treatments, fire intensities and fire sizes would be expected to remain above historic levels. This in turn would continue to result in the loss or degradation of wildlife habitat. The BLM has proposed juniper reduction projects in areas to the north and northwest of the Opine area. If implemented, the reduction in juniper numbers and distribution would help to reduce fire intensities and sizes and thereby result in the retention of more wildlife habitat and potentially create additional habitat diversity across the landscape.

The effects of past vegetation and fuel reduction activities in the Opine planning area are reflected in current vegetation conditions. Within deer winter range, both biological and management area, pretreatment cover levels are or were below those prescribed by management area direction or goals and objectives. Although treatments resulted in additional reduction in cover levels, in no instance have such treatments resulted in cover levels being reduced to zero in either the short or long term. Current and future projects in the Aspen, Lady, and Kenobi planning areas, and those continuing to be implemented in the Fuzzy planning area, would be expected to continue to reduce cover percentages across the landscape. Use of no treatment blocks, identification and retention of high quality cover, and other similar practices and techniques would be expected to maintain biologically sustainable levels of cover across the larger landscape.

It is reasonable to assume that the management of habitat for MIS, PETS, and other wildlife species would continue in future project planning. Habitat protection and enhancement design criteria and mitigation measures would continue to provide suitable habitat across the landscape. Restoration of historic vegetation conditions as reflected in the use of HRV or other similar measures would tend to favor the enhancement of habitats for those species favoring those historic habitats. Application of appropriate management requirements would also favor the maintenance of a diversity of habitats across the landscape. It is therefore reasonable to assume that the cumulative effect of past, present, and future actions would maintain habitats for a range of species across the landscape and that there would be no risk or potential risk of individual species

The removal of approximately 300 trees to restore telescope views and allow for the construction of new facilities within the special use permit boundaries of the Pine Mountain Observatory would also help to protect existing large diameter, mature and old growth ponderosa pine located on the western portion of the permit area. Removal of these trees would serve to break up both vertical and horizontal fuel continuities thereby reducing fire intensity and the risk of a ground fire climbing into the tree canopy. The risk to these trees would remain relatively high under Alternative 1 because no adjacent areas are treated thereby allowing a high intensity and/or crown fire to approach and entry the permit area. Because adjacent areas are treated under Alternatives 2 and 3, the risk of a high intensity and/or crown fire would be reduced thereby reducing the possibility that these trees would be damaged or killed by a wildfire.

Vegetation and fuel reduction treatments likely to be proposed in the Lady and Kenobi planning areas in the next 3-5 years would have no measurable cumulative impacts on hiding or thermal cover within deer winter range. Neither area has either biological or designated (MA-7) winter range within their boundaries. Treatments would be expected to meet LRMP standards and guidelines for other LRMP land allocations, including deer summer range.

The entire northern and eastern boundary of the Bend-Fort Rock Ranger District would have a mosaic of vegetation types and structures across the landscape. This mosaic would be more resilient to disturbance from insects, disease, and wildfire. Large scale disturbances that result in the loss of or the reduction in the quality of wildlife habitat would be minimized. Wildlife would have suitable available habitat within reasonable distance should a disturbance event alter or destroy portions of existing habitat.

Forest Plan Amendments – Except as discussed below, there are no identified cumulative effects under any of the three alternatives. There are no identified actions in the next 5-10 years beyond those proposed under Alternatives 2 and 3 that would remove any existing forest or shrub cover components that currently provide or potentially would provide thermal and/or hiding cover. Actions proposed under Alternatives 2 and 3 in forested stands are intended to preclude additional treatment for at least 20-30 years.

A forest plan amendment to restrict OHV and other motorized vehicle travel to designated routes (roads and trails) would indirectly affect the effectiveness of hiding and thermal cover levels under both Alternative 1 and 2. By eliminating cross-country motorized travel, fragmentation and harassment of wildlife would be reduced making existing and marginal cover more effective. As this would take at least 3-5 years to develop and implement, cover effectiveness would not be improved until the amendment was implemented. There would be no measurable effect under Alternative 3 because an administrative closure restricting motorized travel to designated routes would implemented as part of the decision and would continue until the forest plan amendment was implemented. The plan amendment would replacement the administrative closure with the same or similar requirements.

Condition of Vegetation – Two adjacent planning areas, Kenobi and Lady totaling approximately 57,500 acres, are planned for vegetation and fuel reduction treatments during the next decade. It is assumed that approximately 15 percent of those acres, approximately 8,625 acres, would have a density reduction or regeneration activities prescribed. Although the number of acres rated as moderate to high risk for bark beetle attack or have disease problems such as dwarf mistletoe is currently unknown, it is likely that priorities for treatment will be given to those stands with risk of beetle attack or higher levels of mistletoe infestation. Of these acres, it is estimated that approximately 855 would have a regeneration prescription applied followed by either natural regeneration or planting.

Past vegetation management activities in adjacent areas, primarily in the Fuzzy planning area to the west, and Aspen planning area to the south, have or are currently implementing vegetation management activities. In Fuzzy, **** acres were treated using commercial thinning, non-commercial thinning, or a combination of the two. Of these acres, ***** were identified as being at moderate to high risk for bark beetle attack. A total of *** acres were treated to control mistletoe. These actions left ***** acres rated as moderate to high risk for beetle attack and **** acres with continuing mistletoe infections. For the Aspen planning area, the numbers are ***** acres of moderate to high rating for bark beetle attack with **** acres treated and ***** acres of mistletoe and ***** acres treated. Since the initiation of the Fuzzy treatments in 19** and through approximately 2015, a total of ****** acres of ponderosa pine and lodgepole pine stands rated as moderate to high risk for bark beetle attack will be treated. This is approximately ** percent of the forested acreage rated as moderate to high risk. Approximately ** percent or **** acres of dwarf mistletoe infested stands will have been treated. In the short term, the next 10 years, or in the case of the Opine area units, the next 10-20 years, these treated acres would remain in the low to moderate risk category for bark beetle attack. There would be a relatively limited but unknown or at least uncertain increase in the number of acres rated as moderate to high risk that are untreated. This increase would be associated with continued growth in those stands and the elevation of the risk hazard on some of those acres from low to moderate or moderate to high. A similar scenario would be expected on acres infected with or treated to control dwarf mistletoe infection levels. Longer term, three decades and longer, it is reasonable to assume that the number of acres rated as moderate to high risk for bark beetle attack would again approach pre-treatment levels with subsequent treatments or other disturbance such as wildfire. These levels would be expected to increase the risk and potential for a large scale insect outbreak affecting hundreds or thousands of acres across the landscape.

Approximately 300 trees within the special use permit boundaries of the Pine Mountain Observatory currently limit or will limit telescope views to the lower night skies or occupy sites proposed for new facility construction. A Categorical Exclusion and Decision Memo were completed on ****, 2005 authorizing the Observatory to remove those trees. Under all three alternatives, this would move current vegetative conditions closer to those present on that site at the time the observatory was constructed in 1967.

Wildfire Risk – During the past 10 years, ***** acres of fuel reduction activities have been proposed or have been implemented or are being implemented in areas adjacent to the Opine planning area or within

the MA-7, deer winter range, LRMP land allocation. This includes ***** acres in the Kelsey planning area, ***** acres in the Fuzzy planning area, and ***** acres in the Aspen planning area. Approximately ** percent, or ***** of those acres are in the MA-7 allocation. Additionally, fuel reduction treatments are likely to be proposed in the ********* planning areas using a mix of mechanical treatments such as mowing and commercial and/or non-commercial harvest and prescribe fire. Based on existing information, it is anticipated that approximately ** percent, or ***** acres would be expected to receive some type of fuel reduction treatment 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 treated 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.

Based on the work in the Opine planning area, approximately 30 percent of the acres, 17,250 acres, in the Kenobi and Lady planning areas would be proposed fro fuel reduction treatments using mowing, prescribe fire, or a combination.

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 propose to increase the number of visitors to the facilities above current levels of 2,500 to 3,000 per acre. There would be no measurable change in the risk of a fire being caused by a visitor.

Other Impacts

Much of the forested area in the Tepee Draw and Sand Springs areas were obtained by the Forest Service from private commercial interests over 50 years ago. Prior to acquisition by the Forest Service, the previous owners harvested most of the existing large diameter ponderosa pine. In the past 30 years, approximately 20 percent, 5,248 acres, has experienced one or more vegetation treatments; either commercial or non-commercial harvest or both. Approximately 81 percent of those acres, 3,190 acres, have received more than one treatment with 215 of the 3,190 acres having experienced multiple commercial harvest entries. Alternative 2 would re-enter 932 previously treated acres; Alternative 3 1,132 acres. The majority of those acres, 525 acres under Alternative 2 and 763 acres under Alternative 3, had previous commercial entries. The remainder had only non-commercial thinning without the use of mechanized equipment.

There is no available information that identifies timber harvest activities prior to these lands being acquired by the Forest Service. Other than old railroad grades, there are no documents identifying the

location of skid roads or landings. Therefore, no efforts have been made to determine the specific impacts those activities might have had. Based on current practices, it is reasonable to assume that future entries into forested areas in the planning area would utilize existing skid roads and landings to minimize future soil impacts. It is also reasonable to assume that impacts that exceed standards and guidelines for soil impacts would be mitigated to reduce those impacts to either LRMP standards and guidelines or to a level at or below conditions existing at the time of entry.

Soils - No outyear planning efforts for future management activities are currently scheduled within the Opine project area boundaries. 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 remain at 1,584 acres or approximately 2.8 percent of the planning area. Under Alternatives 2 and 3, the number of detrimentally impacted acres would increase by 712 and 845 acres respectively, or to approximately four (4) and 4.3 percent respectively 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 to 19 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.

Upgrades to existing OHV facilities – trails, trailheads, staging areas, and play areas – within the East Fort Rock OHV area would have no measurable effect on the levels of detrimentally disturbed soils within the planning area. Proposed activities would occur on existing sites. Two (2) trails, totaling approximately 2.5 miles, would be relocated with little or no change in mileage resulting in no measurable changes in the amount of detrimentally impacted soils. The primitive Sand Springs campground would be improved within the boundaries of the existing use area.

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 would result in an increase of approximately three (3) acres of detrimental soil compaction and loss of vegetation around those water sets. This would result in an approximately 0.006 percent increase in the number of detrimentally impacted acres of soil in the planning area. The percentage of the planning area containing detrimentally impacted soils would remain at approximately 2.8 percent.

Reauthorizing grazing within the Sand Springs Allotment is likely during 2005. It proposes 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. Less than one quarter (0.25) mile would require soil disturbance and result in less than one (1) acre of soil compaction, disruption 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.

One additional small waterline extensions, totaling less than one quarter (0.25) mile would also result in disturbance of less than one (1) acre of soil. The effects and duration of effects would be the same as described above. Construction of extensions would result in no measurable long-term increases in detrimental soil impacts.

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 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 direct or indirect 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. Consequently, there would be no measurable 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 CWD associated with any reasonable and foreseeable action. None of the actions would affect the amount or quality of CWD 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.

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.

Proposed, Endangered, Threatened, and Sensitive (PETS) Plant Species - There would be no measurable cumulative effects on proposed, endangered, threatened, or sensitive plant species (PETS) under any of the three alternatives. Only the pumice grape fern and green tinged paintbrush are found within the planning area.

The Cinder Hill Range Analysis EA determined that grazing activities proposed in the Cinder Cone and Pine Mountain Allotments would have no measurable impact on populations or habitat of the green tinged

paint brush. It is reasonable to expect that a similar determination will be made for populations located in the Sand Springs Allotment under the Cluster II Range Analysis EA. There would therefore be no measurable cumulative effects on this species or its habitat under any of the three alternatives considered in this analysis although individual plants or portions of populations may be impacted by grazing and/or proposed vegetation and/or fuel reduction treatments.

No measurable cumulative effects have been identified on either pumice grape fern or its habitat under any of the three alternatives considered in this analysis. The Cinder Hill EA determined that there would be no effect of grazing on the species because the population located in the South Pasture of the Pine Mountain Allotment would be fenced out to exclude livestock. The Cluster II EA is expected to make a similar call although grazing as proposed is likely to impact individuals but would not be expected to move the species toward federal listing. No units are proposed in or adjacent to known habitat under either of the two action alternatives that would measurably impact individuals, populations, or habitat.

Expansion of the Pine Mountain Observatory special use permit area and the construction of new facilities and the upgrade of existing infrastructure is not expected to have measurable cumulative impacts on either the green tinged paintbrush or its habitat. Some existing habitat is included in the permit area expansion. However, no new construction or infrastructure improvements are proposed or planned within that habitat. The approximately one (1) acre of vegetation that would be removed is dominated by trees and does not currently contain suitable habitat. Long-term vegetation management activities to be implemented to reduce the risk of uncharacteristic wildfire within the permit area boundaries would help to maintain existing habitat by reducing fuel loadings that increase the risk of a higher intensity fire. Removal of encroaching trees to maintain telescope views would also help to maintain the shrub communities important for the establishment and maintenance of the paintbrush.

There are no known populations or habitats suitable for the pumice grape fern within or adjacent to the Pine Mountain Observatory permit area. Activities, including the expansion of the permit area, would have no measurable cumulative effects on either the species or its habitat.

Continued vegetation management and line maintenance activities associated with the BPA transmission corridor is likely to have no measurable cumulative effects on either the paintbrush or the pumice grape fern under any of the three alternatives. Removal of encroaching trees would help to maintain the shrub community within the clearing width of the corridor thereby maintaining the potential host species associated with the paintbrush. The irregular and intermittent use of vehicles to access and perform vegetation management and line maintenance activities would be expected to affect scattered individuals but not the species or its habitat as a whole. These activities are conducted primarily by hand with vehicles generally accessing towers using existing roads.

Establishment and maintenance of the transmission line corridor appears to have resulted in created new habitat and resulted in additional individuals and populations in previously forested areas adjacent to the pumice flats through which the transmission line corridor runs. The effects of continued vegetation and line maintenance activities are similar to those for the paintbrush but given the more limited population and available habitat, provide a much greater impact to both the species viability and habitat availability.

It is highly probable that a forest plan amendment will be implemented within three to five years that will change the current OHV management policy from open unless posted closed to one of closed unless posted open. The impacts of this on the paintbrush and pumice grape fern are similar to that described under Alternative 3 for the imposition of the area closure to unrestricted motorized cross-country travel. However, under Alternatives 1 and 2, these impacts would not be accomplished until the plan amendment is accepted and implemented, at least 3-5 years and potentially longer. Until that time, the impacts of OHV use on both species would continue as described under Alternatives 1 and 2. Implementation of this

plan amendment would have no measurable impact under Alternative 3 because it would essentially replace the administrative order closing the area outside of the East Fort Rock OHV area to cross-country motorized vehicle travel. The impacts described under Alternative 3 would likely have been attained by the time the amendment was implemented.

Noxious Weeds and Invasive Plants - No vegetation or fuel reduction projects have been identified for the planning area for at least the next 10-20 years. There are therefore no identifiable, measurable cumulative effects under any of the three alternatives.

Vegetation and/or fuel reduction projects are likely to be proposed and implemented in adjacent planning areas to the west and south of the Opine planning area. As those activities would be expected to follow similar requirements to prevent the introduction and spread of noxious weeds and other invasive plants, it is reasonable to expect that there would be no measurable cumulative effects associated with those activities under any of the alternatives.

Most known populations of noxious weeds and invasive plants are associated with the existing transportation system: system roads; motorized trails, dispersed recreation sites, etc. It is reasonable to expect that continued use of these facilities 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 decommissionings 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 continuation of grazing in the Cinder Cone, Pine Mountain, and Sand Springs Allotments has no measurable cumulative effects on the introduction or spread of noxious weeds or other invasive plants under any of the three alternatives. Grazing is continuing in the Pine Mountain and Cinder Cone Allotments for the next 10 years resulting from the Cinder Hill Range Analysis EA and is likely to continue in the Sand Springs Allotment under a decision expected in the Cluster II Range Analysis EA. Livestock have not been identified as a major vector agent in the introduction and spread of existing noxious weeds as most known populations are located adjacent to the existing transportation network (roads). No known populations of noxious weeds were identified in pastures away from roads in either the Cinder Hill or Cluster II analyses. The Cinder Hill analysis noted that grazing did not appear to increase the risk or potential for the introduction of noxious weeds. Both past and 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 Range Analysis EA noted that invasive plants, and specifically cheatgrass, was present, particularly around water sets but did not appear to be a concern in grazed areas away from the water sets. Based on current information, a similar conclusion is likely to be reached in the Cluster II analysis. There would be no measurable cumulative effects under any of the three alternatives.

The on-going weed control program is expected to continue. It has been successful at reducing weed populations and eradication local populations through hand pulling and the application of herbicides. The expected Record of Decision for the Regional Weed EIS would provide additional tools, particularly herbicides, to control noxious weeds and other invasive plants. It is likely that the Deschutes National Forest would develop a local EIS that would analyze weed control activities and provide additional and more specific, localized direction to control those populations. Both would be expected to result in

reduced population numbers and distribution of targeted species across the forest and within the planning area regardless of the alternative selected. Neither is likely to result in a measurable reduction in cheatgrass given that it is not a designated noxious weed and is pervasive across the landscape under any of the three alternatives.

The Deschutes National Forest is likely to propose a forest-wide plan amendment to restrict motorized use to designated roads and trails within the next several years. Within the Opine planning area, it would only directly affect those areas outside of the East Fort Rock OHV area. Although it is likely to take 3-5 years to develop and implement (including appeals and possible litigation), the impacts would be primarily associated with Alternatives 1 and 2 because neither of those alternatives would prohibit cross-country motorized vehicle travel outside of the East Fork Rock OHV area. The effects would be similar to those described under Alternative 3 for the proposed administrative closure of those same acres except that the closure would occur at least 3-5 years into the future. Until the amendment was implemented, unrestricted cross-country motorized travel would continue to increase the risk and probability of introducing and spreading populations of noxious weeds and other invasive plants. If Alternative 3 is selected, the amendment would replace the administrative closure and result in no measurable impacts.

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.

Scenic Resources – 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 approximately **** and **** acres respectively to the existing inventory.

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.

Implementation of a forest plan amendment to restrict OHV use to designated roads and trails is likely to be proposed and implemented within the next 3-5 years. Upon implementation, the effects would be similar to those described under Alternative 3 for OHV use. For both Alternative 1 and 2, this would be at least 3-5 years, during which OHV use would be expected to continue to increase along with the associated impacts of noise and dust and the resulting declines in the quality of scenic resources. Under Alternative 3, the amendment would replace the closure order and no measurable changes in noise, dust or scenic resource values would be expected.

Along with the amendment, it is likely that a designated OHV trail system would be developed on at least Pine Mountain and potentially other areas within the Opine planning area. Some increase in dust and noise and resulting reductions in scenic resource values would be expected with the levels of those changes depending upon the location and extent of the trail system.

The continuation of grazing in the Pine Mountain and Cinder Cone Allotments was permitted as a result of the Cinder Hill Range Analysis EA (2004). The continuation of grazing in the Sand Springs Allotment is currently being analyzed in the Cluster II Range Analysis EA. No significant effects of grazing on scenic resources were identified in the Cinder Hill EA; none are expected in the Cluster II EA.

Range – Grazing in the Cinder Cone and Pine Mountain Allotments was reauthorized in the decision notice for the Cinder Hill Range Analysis Environmental Assessment (2004). In addition to reauthorizing grazing it authorized new water sets, new fences, expanded the size of the allotment, and reconfigured pastures. In the Cinder Cone Allotment, it also increased the number of pastures from five (5) to seven (7). Actions authorized by that decision would have no measurable cumulative effects under any of the three alternatives considered under this analysis. Adherence to utilization standards is expected to minimize the risk of livestock browsing bitterbrush thereby maintaining more browse for deer. In the Cinder Cone Allotment which has a large portion of the winter range in the planning area, increasing the number of pastures also helps to reduce the competition for bitterbrush. The permittee has greater flexibility in managing the distribution of livestock including moving them to other pastures when utilization standards are met. 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. Although Alternative 3 actually proposes to treat more acres, approximately 6,769 acres are associated with sage-grouse habitat enhancement where no measurable improvement in forage would be expected.

Continuation of grazing in the Pine Mountain Allotment was determined to have no measurable impact on sage-grouse or sage-grouse habitat. Placing and utilizing water sets on the lower slopes of Pine Mountain has been successful in minimizing livestock usage in nesting habitat during nesting. Monitoring of

utilization would continue to insure that habitat is maintained for both nesting and brood rearing. Under Alternative 1, existing mixed grass and shrub habitats would continue to be converted to shrub dominated habitats. Remnant grass components would become more important and grazing that exceeded utilization standards would be more likely to result in habitat degradation. Under Alternatives 2 and 3, implementation of fuel reduction and vegetation treatments would not be expected to result in habitat degradation due to grazing because of increased forage availability and the higher probability of meeting but not exceeding utilization standards.

Grazing was determined to have no impacts on PETS plant species. Livestock do not graze the green tinged paintbrush although some damage likely occurs from trampling and related activities. The population of pumice grape fern in the South Pasture is being fenced to exclude livestock so there would be no impacts to that species.

The Sand Springs Allotment is currently being analyzed under the Cluster II Range Allotment Environmental Analysis. Grazing is proposed for reauthorization and additional improvements authorized including the extension of the existing waterline. There are no measurable cumulative effects associated with the proposed action or any of the other alternatives. Projected impacts are the same as described above except for the following:

- there is no sage-grouse habitat in that portion of the allotment within the planning area and therefore there would be no effects on either sage-grouse or its habitat; and

- under the current management alternative, continued grazing may affect individuals and the population of pumice grape fern and may result in a trend toward federal listing. None of the other alternatives, including the proposed action, would not likely result in a trend toward federal listing if implemented with the proposed design criteria and mitigation measures..

Effects on the permittee would be similar to that described above.

Approximately 2.5 miles of existing OHV trails in the East Fort Rock OHV area are proposed for relocation and the original trails rehabilitated. There would be no measurable cumulative effect under any of the alternatives because there would be no net change in the number of miles of trail. Some reduction in the harassment of livestock would be expected because the trails would be relocated away from existing fence lines where livestock tend to trail.

Expansion of the Pine Mountain Observatory permit area and construction of new facilities would have no measurable cumulative effect under any of the alternatives. Approximately one (1) acre of vegetation would be lost to new buildings, infrastructure, and other facilities; most of this is currently treed and provides little or no forage for livestock. The observatory site is currently not fenced to exclude livestock and there are no plans to do so.

The forest plan amendment to change current forest policy on OHV use from open unless posted closed to one of closed unless posted open would have measurable cumulative impacts under at least Alternatives 1 and 2. For the approximately 3-5 years it would likely take to develop and implement the amendment (including probable appeals and lawsuits), OHV use, particularly on Pine Mountain would likely continue to result in continued damage to fences where riders have cut or otherwise damaged fences to access other areas. It is likely that administrative use, including the use by permittees to maintain improvements, would be permitted. Because Alternative 3 implements a closure of the area to such use, the amendment would replace the closure order. The effects would have been realized when the closure order was implemented. As part of the amendment process, it is likely that a designated trail system would be implemented. Although it is not possible to identify what such a system would include, it is likely that

something similar to that proposed for Pine Mountain would be included. Because there are no specifics, no specific effects can be identified. However, in general, such a system would reduce damage to range improvements reducing maintenance and repair costs, and reduce conflicts between permittees and riders as well as between riders and livestock.

Maintenance of the BPA transmission line corridor would have no measurable cumulative effect under any of the three alternatives. Maintenance would continue to remove encroaching trees thus maintaining the existing shrub and grass/forb vegetation and therefore forage for livestock. The amount and irregular timing of activity is not likely to result in any measurable increases in forage quantity, quality, or distribution. Increases would only be expected where shrub cover is reduced or eliminated and this is not expected.

Similar impacts but much smaller impacts would be expected from the maintenance of the two (2) powerline corridors maintained by the Central Electric Cooperative which access the Antelope electronic site and from Mahogany Butte to the BPA Sand Springs substation. Central Electric has proposed expanding the corridor widths to 20 feet. Some increase in forage would be expected with the reduction or elimination of tree cover. Given the width, length, and location of the corridors, the amount of the increase would be expected to be minimal.

The BLM recently issued the **Final Environmental Impact Statement for the Upper Deschutes Resource Management Plan** that identifies a number of projects that the BLM may institute in coming years on BLM managed lands to the north of the Opine planning area. Projects covered in this programmatic document that have the potential to affect grazing in the planning area include grazing, OHV use, and juniper control. At this time, no specific projects or project areas are identified although areas where such activities may be implemented are identified.

Juniper control activities that reduce or eliminate juniper from designated areas would help to retain or restore shrub and shrub grass communities. As many of these lands adjacent to the Opine area are winter range regularly utilized by mule deer during winter months, controlling the density and distribution of juniper would help to maintain browse, particularly bitterbrush for mule deer. Increasing the distribution and availability across larger areas of the landscape would help to reduce browsing pressure on individual areas. Controlling juniper also would maintain or increase the quantity, quality, and distribution of grasses, forbs, and other shrubs important for both wildlife and livestock. Increased quantities, quality, and distribution of forage species desired by livestock would also serve to reduce the risk of livestock browsing bitterbrush resulting in more bitterbrush being potentially available for deer.

Maintaining and/or improving forage quantity, quality, and distribution would also help to maintain livestock levels that are dependant upon a mix of private, BLM, and Forest Service lands for grazing.

The number of miles of open OHV trails in the South Millican OHV area is also proposed for reduction. This would have no measurable effect on grazing within the Opine planning area under any of the three alternatives. The reduction in trail mileage is likely to displace an unknown number of riders to the East Fort Rock OHV system. However, the degree of increase would be difficult to measure against the expected increase in use in the East Fort Rock given continued growth in this activity.

Reduction in OHV trail mileage in the South Millican area may also improve habitat for sage-grouse by further reducing the loss of habitat and reducing harassment of birds. As this area contains the leks used for birds nesting on Pine Mountain, habitat improvements and reductions in the level of harassment may result in an increase in breeding success resulting in additional nest sites on Pine Mountain. Over the long term, this may require relocation of water sets, additional modification of grazing seasons, and/or modification of utilization standards.

Assuming that grazing is retained on BLM managed lands at current stocking levels, there would be no measurable cumulative impacts on grazing in the planning area. Permittees currently grazing the allotments in the planning area currently utilize a mix of private, BLM, and Forest Service lands to support herds throughout the year. Should the BLM decide to expand or reduce stocking levels, it could affect stocking levels within the planning area. Reduced herd sizes grazing BLM lands could result in reductions in allotments in the planning area. Increasing herd sizes beyond current limits allowed under existing Forest Service permits could result in the permittee having to either reduce herd sizes resulting in a potential loss of income or require acquisition of additional grazing lands resulting in both increased costs and reduced income.

Recreation – Continued grazing in the Pine Mountain, Cinder Cone, and Sand Springs Allotments would have limited cumulative impacts on either developed or dispersed site activities and sites. No developed or dispersed sites are fenced to preclude livestock so livestock can wander through all sites. 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. Evidence of livestock including tracks, manure, and potentially smells, are likely to be experienced by users. Impacts are minimized by locating water sets away from the campground thereby reducing the risk of large numbers of livestock congregating in or around the campground. The use of a rest rotation grazing system also limits the time livestock are in the same pasture as the campground. It is unlikely that grazing and 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.

Similar impacts are expected on dispersed sites. However, as most of the use of these sites occurs in the spring to early summer or later in the fall when temperatures are lower and soils less dusty, the probability of livestock and people interacting is more limited. Rest rotation grazing systems and the placement of water sets further reduces the risk. However, historically, water set locations have commonly been utilized as dispersed camp sites when livestock are not present with abandoned water sets continuing to experience use as camp sites. In some instances, this use has resulted in abandonment and relocation of specific water sets to reduce conflicts between livestock and recreational users.

Continued grazing does increase the risk of accidents between private vehicles and either livestock or water trucks. 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 is 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 5-10 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. Because many programs 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 East Fort Rock 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 Alternatives 1 and 2, such increases are also likely to result in the development of additional dispersed sites, especially outside of the OHV area. Under Alternative 3, the development of additional dispersed sites would be expected but at a reduced level due to the closure of the remainder of the area to motorized cross-country travel and the closure of non-system roads and trails to motorized use. Some of this increase may be directed to sites outside of the planning area, including onto other adjacent ownerships.

If a forest plan amendment is implemented that implements a policy of closed unless posted open relative to motorized cross-country travel within the next 3-5 years, impacts to recreational activities, particularly dispersed sites, would be similar to those described under Alternative 3 for closed and decommissioned roads and the implementation of the closure order. However, as it is likely that this plan amendment would likely require 3-5 years to develop and implement, including expected appeals and potential litigation, those impacts would not be felt until the amendment is actually implemented. This would only be true if either Alternatives 1 or 2 of this analysis were selected as neither implements an area closure or closes non-system roads and trails. There would be no measurable impacts expected under Alternative 3 because the plan amendment would replace the area closure and closure of non-system roads and trails.

It is likely that the forest plan amendment would also propose the location and development of a system of designated roads and trails open to motorized travel. Specific route (road and trail) locations are not known at this time although it is likely that routes proposed under the Opine Access EA, dropped due to budgetary constraints and the expected forest plan amendment on OHV use would be considered. However, this is speculative at this time and therefore the effects of such actions cannot be determined.

Continued maintenance of the BPA substation area and transmission line corridor has no identifiable, measurable cumulative effects on recreational facilities or uses.

Heritage Resources - No measurable cumulative effects have been identified on cultural resources within the planning area. Past, present, and future management actions have and would continue to avoid known sites. Unknown sites would continue to be protected through appropriate contract language and on-the-ground protection through either data collection or avoidance.

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 measurable cumulative effects on either known or unknown sites.

Off Highway Vehicles - OHV use would continue in the East Fort Rock OHV area. The proposed relocation of two trails would result in no measurable change in the number or miles of trail open to OHV use. The proposed upgrading of facilities, including staging areas and the Sand Springs Campground would be expected to result in some additional increase in use although the amount of the increase cannot be determined.

The Cinder Hill Range Analysis (2004) to reauthorize grazing in the Pine Mountain and Cinder Cone Allotments determined that there were no measurable effects on OHV use when proposed water set relocations and fences to prevent conflicts with livestock at staging areas were included. Grazing in the

Sand Springs Allotment, currently being analyzed in the Cluster II Range Analysis EA would be reasonably expected to reach a similar conclusion.

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 west of the Opine area. Fuel treatments similar to those in Opine are being analyzed and a decision expected in the near future in the Aspen Planning Area to the south of Opine. During the next 3-5 years, similar fuel reduction and vegetation treatments are likely to be proposed in portions of the OB1 and Kenobi planning areas to the south and west of the Opine area.

Fuzzy, Kenobi, and OB1 contain portions of the East Fort Rock OHV area. Effects of treatments on OHV use and facilities in the Fuzzy planning area were similar to those described in this analysis for both the East Fort Rock portion and the open areas outside of East Fort Rock. Effects of proposed treatments in the Aspen planning area have reached a similar conclusion. It is expected that assuming similar issues and concerns, design criteria, and mitigation measures, similar determinations would be reached for activities proposed in both the OB1 and Kenobi areas.

Potentially the greatest impacts on OHV use will result from the likely adoption of a forest-wide forest plan amendment to move the Deschutes National Forest from the current policy of allowing motorized use across the forest unless posted as closed to a policy of closed unless posted open. This would also likely include the development of a designated trail system including a combination of motorized use trails and shared use roads similar to that existing in the East Fort Rock OHV area. The largest impacts would be felt under Alternatives 1 and 2 because no area closure to motorized use would be implemented under either of those alternatives. Current use would continue under the amendment was adopted and all appeals and legal challenges resolved. This would be expected to take at least 3-5 years. When implemented, the expected impacts would be similar to those described under Alternative 3 for the closing of the area outside of the East Fort Rock OHV area to motorized cross-country travel. Current OHV uses and practices would continue with the identified impacts until the amendment was implemented. The amendment would have no measurable effect under Alternative 3 because that alternative would institute a closure on the 28,647 acres of the planning area currently outside the East Fort Rock area. The forest plan amendment would replace the closure order and make the closure permanent.

Part of the forest plan amendment process would likely be the designation of trails and shared use roads for motorized use. For the Opine planning area, this was to be part of an access management environmental assessment that addressed OHV access, road management, and additional non-motorized trail access in the planning area. Time and monetary constraints coupled with a nationwide wide concern about motorized recreational access resulted in this effort being delayed and incorporated into the proposed forest plan amendment. This process is likely to include a proposal for the development of a designated OHV trail system on Pine Mountain. If it follows proposals developed during the access EA process, it would utilize existing trails and roads and require the construction of less than one (1) mile of new trail construction. In general, the cumulative effects of this and any other proposed system in the planning area would be similar to those described previously under the Alternatives 2 and 3 direct effects discussion, regardless of the alternative selected. Additionally, the development of additional OHV facilities and trail systems, particularly on Pine Mountain, would be expected to result in measurable increases in OHV use, potentially also increasing the period of use. This increased use, especially on Pine Mountain, is likely to also result in at least some increase in concerns over noise levels and the creation of dust that could affect air quality that would in turn affect the quality of views from the Pine Mountain Observatory telescopes. It is expected that these impacts would be similar regardless of the alternative selected under this analysis.

Special Uses - There are no identified cumulative effects associated with other special use permits or activities including the continued use of the two microwave sites on Pine Mountain, the expansion of the Pine Mountain Observatory special use permit area and the construction of new facilities, or the BPA transmission line right-of-way and substation.

8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historic resources.

There are no districts, highways, or structures in the planning area that are listed in or eligible for listing in the National Register of Historic Places. Therefore, there would be no measurable effect on those districts, highways, or structures under any of the alternatives.

There are no known sites or objects eligible for listing in the National Register of Historic Places located within any of the proposed project areas either of the action alternatives. Proposed activities are all located to avoid all known sites. There would be no measurable effect on known sites or objects under any of the three alternatives.

There would be no effect on unknown sites or objects under Alternative 1, No Action because no activities would be implemented that would potentially impact such sites or objects. Unknown sites or objects identified during implementation under either of the action alternatives would be protected by appropriate contract language in service and timber sale contracts. Discovery of unknown sites during project implementation would result in the work being halted, the site evaluated, and either the project modified to protect the site or data recovered from the site prior to re-initiation of the work. These practices would be expected to result in measurable adverse impacts to sites or objects.

9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973 (ESA).

No listed threatened or endangered plant or animal species or their habitats are found within the planning area boundaries. No direct, indirect, or cumulative effects are identified under any of the three alternatives.

10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

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. Both action alternatives considered in this analysis are consistent with the Deschutes National Forest Land and Resource Management Plan as amended and with the National Forest Management Act (Silviculture Report, page **,).

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 (ODFW0
- Mark Dunaway, Observatory Manager, Pine Mountain Observatory, University of Oregon
- Jan Hanf, Wildlife Biologist, Prineville District, Bureau of Land Management (BLM)

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

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