

**Environmental Assessment  
for  
Tumalo Vegetation and Trail Management Project  
DOI-BLM-OR-P060-2012-0008-EA**

**U.S. Department of the Interior  
Bureau of Land Management  
Prineville District  
3050 NE Third Street, Prineville OR 97754**

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**The comment period on this Environmental Assessment (EA) ended April 22, 2013.** The BLM has made some minor changes to the EA by incorporating additional information to clarify and address some of the comments made by the public during the public comment period. This slightly revised EA, with the Decision Record (DR) and signed Finding of No Significant Impact (FONSI), has been reposted to the BLM public website. Please see the Decision Record for a summary of minor changes made to the EA in response to public comments, and for further information on the selected alternative.

You can get hardcopies of the EA, FONSI, DR and response to comments on the EA at the BLM office listed above, or electronic versions on the internet at <http://www.blm.gov/or/districts/prineville/plans/index.php>

Thank you for your interest in this project. If you have any questions, please contact Steve Castillo (Project Lead) or Bill Dean (Assistant Field Manager) at 541/416 - 6700.

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# Chapter 1 Introduction

## Location and Proposed Action

This Environmental Assessment (EA) analyzes proposed and alternative actions and their effects in the Tumalo Vegetation and Trail Management Project. The Prineville District BLM (BLM) proposes to reduce tree density (thin trees) and remove biomass on up to 725 acres of an 800-acre BLM parcel located three miles southwest of the town of Tumalo (Map 1). Implementation is expected to begin in spring, 2014, may take up to six years to complete. The vegetation management project would be completed by using a variety of mechanized equipment and hand operated chainsaws. Harvested trees and biomass materials would be removed from the project area. Any residual material created by the vegetative treatments not removed from the project area would be burned or mechanically reduced and spread on site. Trees posing a hazard to people and property would be cut and removed near private residences, along the canals, access roads and other right-of-way facilities.

After the vegetation management project is completed, a 10-12 mile trail system would be designated. The designated trail system would allow connections to the Deschutes National Forest to the west, as well as providing a series of internal loops. Equestrian and bicycle use would be limited to the designated trails only.

The BLM would also implement the motorized vehicle closure called for in the Upper Deschutes Resource Management Plan (USDI, 2005). Administrative access roads would remain on Tumalo Reservoir Road, on lands owned by Cascade Timberlands and on the Deschutes National Forest; however, these roads would be gated (on BLM administered land) and non-motorized access provided through equestrian/bicycle/pedestrian gates. Where administrative access is not needed, the BLM would use natural barriers such as boulders and logs to exclude motorized use. Public access from the east (known as Grave's Driveway) would be gated and signed "closed to motorized vehicles."

## Need

The **need** for action within the Tumalo Vegetation Management project area is to address declining forest health, and the threat to public safety from the accumulation of hazardous fuels and potential for extreme fire behavior.

**Forest Health:** Lack of natural fire and an absence of active BLM management (thinning) have resulted in unnatural conditions of overstocked stands of low-vigor trees, encroachment of western juniper, and occurrence of insects and disease. High tree densities and drought conditions are allowing insects and disease to occur at higher than normal levels, resulting in high tree mortality, low vigor and slow growth.

**Public Safety:** The current stand conditions present a high risk of extreme fire behavior that would threaten human life, private property and natural resource values.

**Wildlife Habitat:** Large ponderosa pine trees that provide suitable conditions for raptor (e.g. bald eagle) nest sites are at risk to mortality due to wildfire, insects and disease under the existing dense stand conditions. There are more than 20 miles of trails and numerous uncontrolled access points in the project area that are contributing to impacts on wildlife habitat in this area. Many of the trails are redundant and break up (fragment) wildlife (e.g., deer, eagle, etc.) habitat or are located too close to a bald eagle nest site.

**Access:** The uncontrolled access points provide additional opportunities for motorized access to the area, which also contribute to habitat fragmentation (e.g., deer winter range). Some existing fences are not located on property boundaries leading to confusion for public access and legal land ownership.

## Purpose

The **purpose** of this project is to restore the ponderosa pine forest, juniper woodland and shrub-steppe plant communities to a more historically representative condition and structure, with reduced fuel loading that would allow fire suppression crews to safely and effectively fight fires on the ground. Additionally, the purpose of this

project is to work toward resolution of long-term recreation trail designations and access needs, reduce fragmentation of mule deer winter range, and protect nesting eagles.

The purpose of this project is consistent with the Upper Deschutes Record of Decision and Resource Management Plan (UDRMP - September, 2005), which provides direction to:

- “Maintain and promote healthy and diverse ... ponderosa pine forest ecosystems” (page 32)
- “Maintain or mimic natural disturbance regimes so that stands are resilient following periodic outbreaks of insect infestation, disease or wildland fire” (page 33)
- “Maintain, promote, and restore the health and integrity of old forest structure and conditions in key habitat areas and in conjunction with wildland urban interface (WUI) management objectives” (page 33)
- “Maintain, promote, and restore the health and integrity of old-growth juniper woodlands/savanna throughout its historic range whenever practicable” (page 31)
- “Maintain/restore large contiguous stands of healthy, productive and diverse native shrub-steppe plant communities throughout their historic range where appropriate considering current conditions and potential for success” (page 30)
- “Restore and maintain ecosystems consistent with land uses and historic fire regimes through wildland fire use, prescribed fire, and other methods. Reduce areas of high fuel loading that may contribute to extreme fire behavior” (page 61)
- “In the WUI, live and dead vegetation will be managed so that a wildland fire would burn with fire behavior where firefighters can be safe and successful in suppression efforts under hot, dry summer weather conditions. Treatments will be designed for human safety while still considering recreation opportunities, wildlife habitat and corridors, visual quality, air and water quality, and public access” (page 62)
- “Provide designated access points (includes entry points, parking areas, trailheads, and/or staging areas) to enhance visitor experience, protect resources, and minimize conflicts with adjacent landowners” (page 134)
- “Provide identifiable non-motorized recreation opportunities to provide visitor satisfaction, protect natural resources, and minimize conflicts among public land users and adjacent land owners” (page 134)
- “Provide habitat that benefits wildlife and retains high wildlife use. Wildlife habitat is a primary management consideration in these areas” (page 55)
- “During seasonally sensitive periods (e.g. breeding, nesting) or in sensitive sites avoid or mitigate for impacts from activities occurring in or near.....” (page 46)
- “Enhance the health of roost and nest trees by reducing competing vegetation” (page 46)

## Issues for Analysis

An issue is a point of disagreement, debate, or dispute with an action based on an anticipated effect. While many issues may be identified during scoping, the BLM only analyzes issues in an EA when analysis is necessary to make a reasoned choice between alternatives, or where analysis is necessary to determine the significance of impacts. To warrant detailed analysis, the issue must also be within the scope of the analysis, be amenable to scientific analysis rather than conjecture, and not have already been decided by law, regulation, or previous decision. Significant effects are those that occur in several contexts (e.g., local and regional) and are intense (e.g., have impacts on public health or unique areas). For more information on significance, see pages 70-74 in the BLM NEPA Handbook H-1790-1 (USDI BLM 2008).

The BLM asked the public for input on issues that should be considered for this project. Many of those comments are addressed in this EA in the Issues section and in the Alternatives Considered but Eliminated Section. In many cases, the comments led to the incorporation of project design features into the action alternatives.

### ***Issues Considered in Detail***

The following issues were raised by the public, by federal, state or local government agencies, by tribes, or by BLM staff, and are considered in detail in this EA:

- *How would the proposed vegetation thinning and biomass removal affect forest health?*
- *How would the proposed vegetation thinning and biomass removal affect public safety (fuel loading and fire behavior)?*
- *How would the proposed vegetation thinning and biomass removal actions affect non-motorized recreation opportunities during project implementation?*
- *How would the proposed designation and controls of access points affect recreation opportunities?*
- *How would the proposed vegetation thinning and biomass removal affect hiding cover for mule deer?*
- *How would the proposed vegetation thinning and biomass removal affect wildlife habitat fragmentation for wintering mule deer?*
- *How would the proposed vegetation thinning and biomass removal actions affect nesting bald eagles and other migratory and resident birds of conservation concern?*
- *How would the proposed trail system affect bald eagles, mule deer and other wildlife such as migratory and resident birds of conservation concern?*

### ***Issues Considered but Eliminated from Detailed Analysis***

While a number of other issues were raised during the scoping period, not all of them warranted detailed analysis to make a reasoned choice between alternatives or to determine the significance of impacts. Appendix B describes issues not analyzed in detail or considered further in this EA.

## Chapter 2 Alternatives

This chapter describes a no action alternative that would continue existing management, and two action alternatives. Only the two action alternatives would meet, to varying degrees, the Purpose and Need described in Chapter 1. The alternatives are summarized in Table 1.

### Alternative 1 - No Action

Vegetation restoration and fuels management would not occur. This alternative would retain existing vegetative conditions and allow current trends to continue. There would be no vegetative treatments to meet forest health, fuels, public safety, or wildlife habitat objectives. Recreation access points and trails would not be designated and a parking area would not be designated or constructed at this time. The motorized closure called for in the UDRMP for the proposed project area would not be implemented under this alternative. A seasonal closure to protect nesting eagles would not be implemented. The Purpose and Need stated in Chapter 1 would not be met under the No Action Alternative. This alternative provides a baseline for the comparison of action alternatives.

### Alternative 2 - Proposed Action

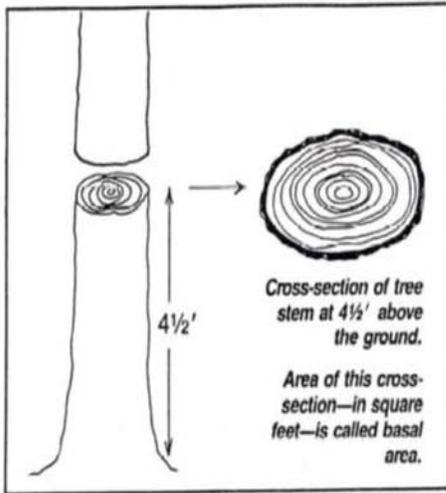
Alternative 2 would treat 687 to 725 acres of ponderosa pine, mixed pine/juniper, and juniper stands (see Table 1 – Comparison of Alternatives). The treatments would be done using a possible combination of hand crews with chainsaws, mechanized equipment including feller-bunchers and skidders in the woods, and loaders, chippers, grinders, and haul trucks on the landings and roads. Feller-buncher machines would cut and bunch trees for later retrieval and transport to the landings by grapple skidders. Approximate locations of proposed new temporary spur roads and landings are displayed on Map 2.

Most of the thinned tree material would be harvested and removed for a variety of wood products including clean chips (pulpwood), firewood, house logs, posts, poles and hog fuel (biomass). Smaller diameter trees, tops and branches within 500 to 600 feet of private residences would be machine- or hand-piled and burned or mechanically mulched and left in-place or spread as a ground cover on disturbed areas such as landings and skid trails. Concentrations of branches and other woody material leftover from thinning in the interior portions (beyond 500 to 600 feet of property boundaries) of the project area would either be burned where it lies or mulched and left as ground cover. Although the general operating season would be August 1 – May 31 (10 months), treatments would be prioritized/scheduled to limit disturbance during peak recreation use, the irrigation season (water flow in canals and ditches), fire restrictions, nesting birds, and weather/soil conditions (See Appendix C, Project Design Features).

#### Treatments within Ponderosa Pine Stands

The largest and healthiest ponderosa pine trees in the stand would be retained, as well as all non-hazardous snags, nest trees, and other trees with special habitat features. Ponderosa pine greater than or equal to 21 inches DBH (diameter at breast height – 4.5 feet above the ground) would not be cut, except those meeting the hazard tree definition (Appendix C). An estimated 90 percent of the trees removed would be in the size range of 4 – 12 inches DBH. Pine trees with disease and/or of low vigor that are competing with nearby healthier and larger trees would be thinned. Thinning of the understory (trees from 2 feet high to 8 inches DBH) would provide for an average spacing of 18 feet (134 trees per acre (TPA)); thinning in the mid-story (trees 9-12 inches DBH) would provide for an average spacing of 20-25 feet (70-109 TPA); and thinning in the overstory (trees 13-20 inches DBH) would provide for an average spacing of 30 feet. In this last size class thinning would be variable and based on site productivity, tree health and vigor, presence of disease, and hazard tree criteria, rather than strict spacing guidelines. In general, smaller trees within 50 feet of the larger and older ponderosa pine trees (generally larger than 21 inches DBH) would be thinned in order to maintain and improve their health and reduce the likelihood of being impacted by a wildfire. Stands in the project area are seldom comprised of one size class of trees, therefore, the actual spacing and final stand density of trees after thinning would be a combination (within the high and low TPAs) of the thinning densities described above.

Within the ponderosa pine stands, the final number of trees left on an acre would be based on the basal area of the stand.



Basal Area: Each tree has its own basal area, measured by estimating the cross-section of a tree stem at breast height (see image, left; source: [www.woodlandstewardship.org](http://www.woodlandstewardship.org)). The basal area per acre then is the sum of each tree's basal area in the project area, divided by the number of acres involved. This number is used to gauge whether the stand is overstocked (too many trees) or under-stocked (too few trees).

The target basal area within the ponderosa pine stands would be in the range of 60-80 square feet per acre; depending on available moisture and soil depth (areas with deeper soils and more moisture can support more trees). Post-treatment ponderosa pine stands would appear much more open with fewer trees and a greater average height and diameter than the current structure. Within 3-5 years, a much more diverse and abundant shrub, grass and herb layer would also develop in the understory. Basal areas of 60-80 square feet per acre are represented in the “proposed conditions” in the first three photo pairs shown later in this chapter.

The number of trees to be retained and their spacing would focus on moving the forested stands toward a healthier ecological condition similar to the historical structure. This would involve applying recommendations from studies by Cochran et al. (1994) and Raymond and Peterson (2005). Cochran study recommendations include number of trees per acre and spacing of trees based on tree size for future tree health. The Raymond and Peterson study gives recommendations to create forest conditions that have the best chance of surviving a wildfire.

Juniper up to 18 inches DBH would be cut and removed. Some juniper 18 inches or greater DBH may be cut and removed when they occur within 50 feet of a ponderosa pine 21 inches or greater DBH. No old-growth juniper of any size would be cut except those meeting the hazard tree definition in Appendix C (See Appendix B for definition of old-growth juniper).

#### **Treatments within Juniper Woodlands and Shrub-Steppe Plant Communities**

Juniper trees up to 18 inches DBH would be cut and removed, except those meeting the old-growth definition or those retained in leave areas. Ponderosa pine occurring within these plant communities would be retained, except when they occur at a density at which they are competing with other pine trees and which would allow for a thinning at an average spacing of 18 feet. Leave tree density would correspond with expected historic structure of these ecological sites, ranging from a juniper woodland of approximately 30 percent canopy closure (about 48 trees per acre) to a juniper savanna of less than 10 percent canopy cover (about 10 trees per acre) to an open shrub-steppe plant community with few to no juniper present.

#### **Treatments within or adjacent to Tumalo Irrigation District ROW Facilities**

Trees along the canals, ditches, bridge, culverts and other Tumalo Irrigation District (TID) ROW facilities that interfere with the operation and maintenance of facilities would be cut and removed. This would include hazard trees that are leaning, are unstable, or are otherwise at risk to falling during high wind events. This type of hazard tree can potentially block TID access, water flow, or cause a breach of canal and ditch containment banks.

**Clump Management**

“Clump management” is a system for leaving strategically located groups of unthinned or lightly thinned trees in a project area. These leave areas would usually be comprised of small healthy pine and juniper trees in the understory where available. Clumps of trees would be left to increase stand structure, provide habitat diversity, hiding cover for wildlife, screening for non-motorized recreation, special area protection, and visual diversity. Locations of effective leave clumps would be dictated by stand condition and structure but an attempt would be made to distribute them spatially across the project area. Clumps would range in size from a group of several individual trees to a patch of one acre or more. To facilitate fuel break effectiveness, most clumps would be retained in areas beyond 300 feet from residential private property boundaries. Any clumps left within 300 feet of residential private property would be small (less than  $\frac{1}{4}$  acre) and would be primarily for the purpose of screening non-motorized trails and roads from direct line visibility of houses. Some clumps in this zone may be lightly thinned to a tighter spacing to remove ladder fuels and treated to remove ground fuels. The total area of clumps within the project area would cover approximately 38 to 76 acres.

**Roads, Skid Trails and Landings**

Approximately 3.75 miles of existing BLM roads within the project area would be used for project access or other administrative use. In addition, up to 0.7 mile of new temporary road may be constructed to provide access into treatment areas currently inaccessible. Temporary roads would be less than 0.25 mile long, 12-14 feet wide, and unsurfaced. Approximately 12 to 18 landings (staging areas for equipment and processing/removal of woody material) would be cleared. Clearings for landings would be approximately  $\frac{1}{4}$  -  $\frac{1}{2}$  acre and would remain unsurfaced. Skid trails to bring vegetative material into the landings would be approximately eight feet wide. Newly constructed temporary roads, skid trails and landings would be closed, re-contoured and disguised after the project is completed and allowed to return to a natural appearance. In addition, existing roads and trails not designated for future administrative or recreational use would be closed and disguised upon completion of operations.

The following photo pairs show the existing stand structure and condition and an example of how the proposed treatment would look when completed:

**Existing Conditions**

**Proposed Conditions**



**Existing Conditions**



**Proposed Conditions**



**Public Access and Trail Design**

After the vegetative treatments are completed a non-motorized trail system with approximately 10 to 12 miles of equestrian, bicycle and pedestrian trails controlled with gates, fences, or barriers would be constructed. Trails would provide connections to the Deschutes National Forest to the west, offer a system of loops, and provide larger blocks of un-fragmented habitat. Upon completion of the vegetation treatments, the trail system would be identified using input from local trail user groups, volunteer groups, special recreation permit holders and BLM staff. The trail system would make the general connections and loops shown on Map 4 in Appendix A; however, on the ground, layout would be open to adjustments to account for situations found during trail layout, such as avoiding a wet area or to get the trail to a ridgeline for better scenic opportunities. Equestrian and bike travel would be allowed on designated trails only.

Future motorized access would only be allowed for administrative purposes, including TID Right-of-Way (ROW) activities and BLM resource management. Existing roads designated for administrative use, and potentially some temporary road construction, would be integrated with the designated trail network wherever possible.

All non-motorized access within the project area would be controlled with gates, fences, or barricades. The non-motorized access points would provide for equestrian, bicycle and pedestrian use.

A seasonal area closure would be implemented to protect nesting eagles. This closure would prohibit access to approximately 80 acres and approximately 1/3 mile of trail to all users from January 1<sup>st</sup> to August 31<sup>st</sup>. The closure may be lifted earlier if monitoring shows the nesting attempt has failed or the young have fledged and are no longer dependent on the nest site. These dates typically occur around mid-May to mid-July, however the closure period allows for the success of late nesters.

### **Travel Restrictions during Implementation**

Although vegetation treatments on the entire project area could take three to six years to complete, they would be implemented such that the public would have non-motorized access to approximately 66 percent (528 acres) of the project area at all times. The active treatment area would be closed to public access during week day work-hours (Monday-Friday from approximately 6:00 am to 5:00 pm) but would be open to non-motorized public use on evenings and weekends. Travel could be limited to administrative access roads, however, as trails may be blocked with forest debris at times. In addition, some access roads may be blocked intermittently to allow haul vehicles to travel safely in and out of the active treatment areas.

### **Alternative 3**

Alternative 3 has the same proposed actions as Alternative 2 with the following exceptions:

- The operating season would be October 1 thru May 31 of each year (8 months).
- Total area treated would be 458 to 572 acres.
- Total area in clumps and untreated leave areas would be 25-40 percent.
  - 5 – 10 percent of leave areas would result from clump management as described above in Alternative 2. The remaining 20 – 30 percent leave areas would result from areas identified on the ground to retain from treatment. These areas would be comprised of dense stands that provide hiding cover for deer, located throughout the project area, away from trails and range in size from 1 – 30 acres.
- No trails would be located within the eagle seasonal closure area.
- Equestrian and bike travel would not be restricted to designated trails.
- A small parking area one-half to one acre in size that would accommodate up to three cars and three small horse trailers would be constructed at the north end of the project area off Tumalo Reservoir Road. The construction activities would include: clearing vegetation, leveling ground surfaces, removing rock, placing barriers, installing fence and gate, and signing. Hardening the ground surface with gravel could also occur. Parking area development would depend on funding availability.

## Actions Common to Alternatives 2 and 3

The project design features described in Appendix C would be applied to both action alternatives.

**Table 1. Comparison of Alternatives**

	<b>Alt 1 No Action</b>	<b>Alt 2 Proposed Action</b>	<b>Alt 3</b>
<b>Vegetative treatments</b>	0	687-725 acres	458-572 acres
<b>Operating season</b>	0	10 months (August thru May)	8 months (October thru May)
<b>Area closed to public access during operations</b>	0	33% of area during 10 months of active operations (100% open evenings and weekends)	33% of area during 8 months of active operations (100% open evenings and weekends)
<b>Years to implement vegetative treatments</b>	0	3-6 years	Same as Alt 2
<b>Develop parking area at Tumalo Reservoir Road</b>	No	No	Yes
<b>Equestrian and bicycle use limited to designated trails</b>	No	Yes	No
<b>Seasonal closure for nesting eagles</b>	No	Yes	Yes

## Alternatives Considered but Eliminated from Detailed Analysis

### Prescribed Fire Only

An alternative was considered that would use only prescribed fire to reduce fuel loading and restore forest health. Fuel loads within some of the ponderosa pine stands; however, are so great that it would be difficult to protect mature trees from burning. In addition, high fuel loads in some locations immediately adjacent to private property would make it difficult to contain prescribed fire to BLM lands. For these reasons, this alternative was not deemed technically feasible; and, therefore it is not analyzed in this EA.

### Fuel Break Treatment Only

An alternative was considered that would use mechanical thinning and slash pile burning to create fuel breaks 200 feet wide along the boundary with adjacent private properties. This would create some defensible space for fire fighters to suppress wildfire, but spotting distance (the distance embers can travel and ignite a fire) and spotting potential would still be high in the untreated areas and may spot over created fuel breaks. Furthermore, this treatment would not reduce fuel loads within the BLM lands to protect resource values from extreme wildfire. Natural resource values such as old-growth ponderosa pine, old-growth juniper, wildlife habitat, riparian zones, recreation and aesthetics would still be at risk and would likely eventually burn or be drastically altered in a stand-replacing wildfire. This alternative would not meet the Purpose and Need; therefore, it is not considered further in this EA.

## Conformance

### Upper Deschutes Resource Management Plan (2005)

Alternatives 2 and 3 would be in conformance with the Upper Deschutes Resource Management Plan and Record of Decision 2005 (UDRMP), which made the following designations for the project area that drive the project proposal and design:

- Priority Ponderosa Pine Restoration Area (RMP Map 9). Old-growth ponderosa pine stands in this area have high habitat, recreation and aesthetic values and are at risk for insect, disease and wildfire damage and mortality.
- Wildland Urban Interface (RMP Map 9). Unnaturally high fuel loads pose a hazard to life and property in adjacent residential areas.
- Commercial Forestland (RMP Map 1). Wood products, including fiber, biomass and fuelwood are an integral part of natural resource management and social/economic values.
- Visual Resource Management Class 3 (RMP Map 10). VRM Class 3 allows changes to the landscape by management activities that are evident to the casual observer but do not dominate the existing landscape.
- Primary Wildlife Emphasis (RMP Map 4). Wildlife habitat is a primary management consideration in these areas and actions need to provide habitat that benefits wildlife and retains high wildlife use.
- Closed Year-Round to Motorized Recreation (RMP Map 3). Roads not needed for administrative access are to be closed or converted to designated trails.
- Non-Motorized Recreation Exclusive Emphasis (RMP Map 4). Trails will provide a variety of loops that offer diversity of trail experiences and serve to disperse users and provide regional trail link opportunities.

## Chapter 3 Affected Environment

### Introduction

The affected environment describes the present condition and trend of issue-related elements of the human environment that may be affected by implementing the proposed action or an alternative. It describes past and ongoing actions that contribute to present conditions, and provides a baseline for analyzing cumulative effects.

The Tumalo Vegetation Management Project addresses the 800-acre BLM parcel located three miles west of Tumalo. The city of Bend is also three miles southeast of the project area. About 763 acres of the parcel are forested; the other 37 acres are non-forested areas that consist of roads, right of ways and canals. The project area is within the wildland urban interface defined as areas where homes are built near or among lands prone to wildland fire. Private lands on the north, east and south are generally small acreage farms or ranches with residential development. Lands to the west are large private ownership blocks and the Deschutes National Forest (see Map 1: Tumalo Vegetation Management Project).

The project area contains two primary canal systems, the Columbia Southern Canal and the Tumalo Feeder Canal. The portion of the Columbia Southern Canal south of the silt pond is not presently in operation, while the Tumalo Feeder Canal is an active canal network. Both the Columbia Southern canal and the Tumalo Feeder canal are covered by rights-of-way issued and administered by the BLM. These rights-of-way are now held by the Tumalo Irrigation District headquartered in Tumalo, Oregon.

The canal system is a major feature of the project area. The historical significance has been reported in the "Historic American Engineering Record, Number OR-151, Tumalo Irrigation District" (Luttrell and Pfaff 2006). The historical settlement of Central Oregon is closely tied to the irrigation projects. While the intended purpose of the canals is to provide irrigation water to areas beyond the project area, they also provide wildlife habitat, aesthetic, subsurface irrigation and other benefits to the area. The roads associated with the canal system also provide recreational access.

### Forest Health

The project area lies in the transition zone between the vast ponderosa pine forest of the east-slope Cascades and the juniper woodland/shrub-steppe vegetation types typical of the high desert region. The forest stands are predominantly dry-site ponderosa pine mixed with western juniper with some pockets of dominant juniper woodland/shrub-steppe in the rockier, shallow soil upland areas. Antelope bitterbrush, sagebrush, Idaho fescue and bottlebrush squirrel-tail dominate the understory. Some riparian species such as willow, birch, alder, and various sedges have colonized seepage areas immediately adjacent to irrigation canals and ditches.

The long-term presence of irrigation canals and ditches has altered the natural site characteristics on portions of the project area. The canals were constructed in the early 1900s, and the active canals have water in them from approximately April 15 until September 30. Seepage from the canals and ditches has allowed the adjacent trees to respond to more available moisture, growing larger and in greater density than the site would naturally allow. The juniper trees within the area of additional available water are also larger, taller, and straight-trunked, unlike their growth form typical of drier sites. In the mid-1990s, use of the Columbia Southern Canal was discontinued, causing the soils adjacent to the canal to lose the extra water. As a consequence, the dense pine and juniper stands adjacent to this canal are showing signs of stress and high mortality.

Fire suppression, beginning in the early 1900s, substantially altered ponderosa pine stand structure. Prior to the early 1900s, the project area would have had a much higher proportion of large old ponderosa pine trees. These large trees would have occurred at a relatively low density, about 8-12 trees per acre, and would have been actively growing with broad, healthy crowns and low incidence of insects and disease. The understory would have had a much lower density of small pine seedlings and saplings, very few juniper, and a much more abundant and diverse layer of shrubs, grasses and herbs. An absence of natural, periodic low-intensity fire has allowed a

proliferation of ponderosa pine and juniper seedlings and saplings to become established underneath the larger trees. Current stand structure within the project area is now a mixture of ponderosa pine and juniper at a much higher density in the understory and mid-story, and with a much smaller average diameter. As an overabundance of trees dominate the site, the understory shrub and herbaceous layer has declined drastically in productivity and species richness. Large and old ponderosa pine trees in the overstory have also declined in numbers, health and vigor as they lose the battle for limited soil moisture and nutrients. As juniper and small ponderosa pine gain in density and dominance, larger ponderosa pines become increasingly stressed and susceptible to competition, insects, disease, drought, and intense wildfire. Many large old ponderosa pine trees have been killed by one or a combination of these factors. Past selective logging practices and single lightning strikes have also removed or killed several large ponderosa pine trees in the project area.

The existing stand structure and density is presenting an extreme hazard for wildfire and risk to life and property in adjacent residential areas. High stress and mortality is producing an abundant number of dead and down trees throughout the project area. Jackstraw trees (trees that have died and fallen in a chaotic fashion) are common along the abandoned Columbia Southern Canal. The dead and down trees, together with multiple canopy layers from the dense ingrowth of seedlings and saplings, have created an extreme fuel loading and ladder fuel situation. Heavy ground fuels and ladder fuels allow a ground fire to climb into the canopy, creating an intense stand-replacing fire event. The current stand density and condition is listed in Table 2.

For analysis purposes (for Forest Health and Public Safety issues) the project area has been divided into the following five vegetation zones described below (see Map 2 in Appendix A):

Ponderosa pine forest: This zone has pine trees in all size classes. Large trees (greater than or equal to 21 inches DBH) are few and well-spaced (approximately 1.6 per acre). There is a large number of small ponderosa pine. There are many young juniper trees invading the zone. There are a few large juniper trees that exhibit old growth characteristics.

Ponderosa pine forest adjacent to active irrigation canals (including feeder ditches): The trees in this zone appear to have the benefit of water from canal seepage (sub-irrigation). This zone is dominated by stands of large ponderosa pine trees. There are also large numbers of pine trees in all size classes, some creating very dense stands. There are juniper trees of all size classes. Some of the juniper trees are very tall and straight but do not exhibit old growth characteristics.

Ponderosa pine forest adjacent to inactive canals: This zone is similar to the previous zone except the canal water was shut off in 1998. Many pine trees are showing stress from reduced available soil moisture. A high percentage of trees within the seepage zone have died, creating an abundant amount of standing snags (dead standing trees) and down logs. Jackstraw trees, heavy down fuel loads, and ladder fuels have created an extreme fire hazard in these areas.

Ponderosa pine forest on lava ridge: This zone is dominated by widely-spaced pine trees. There are pine trees of all size classes, but not in overly dense stands. There are juniper trees of all size classes.

Western juniper woodlands: This zone is dominated by juniper trees of all size classes. This zone has more, large juniper trees with old growth characteristics than the other zones. There are also scattered small and medium sized pine trees mixed in among the juniper.

**Table 2. Stand Condition Data**

Vegetative Zones	Pine trees per acre			Juniper tree per acre			TOTAL TPA	Basal Area	Snags per acre	Logs per acre
	≤ 8"	9 to 20"	≥ 21"	≤ 8"	9 to 17"	≥ 18"				
<b>Ponderosa Pine Forest</b>	80	36	1.64	220	37	1.75	376	115	0	0
<b>Ponderosa Pine Forest Active Canal</b>	85	50	10.83	196	31	2.35	375	242	8	4
<b>Ponderosa Pine Forest Inactive Canal</b>	101	102	4.07	49	6	0	262	178	8	31
<b>Ponderosa Pine Forest Lava Ridge</b>	101	42	5.55	101	19	0.5	269	127	3	0
<b>Western Juniper Woodlands</b>	105	1	0.06	105	8	1.73	220	128	1	0

### **Public Safety (Fuel Loading and Fire Behavior)**

The existing fuel loading and fire regime characteristics for the five vegetative zones are described in Table 3. The existing stand density, fuel loading and expected fire behavior are outside of the historic fire regimes. These current conditions would not allow fire fighters to be safe and successful in suppression efforts under hot, dry summer weather conditions.

**Table 3. Fuel Loading (dead and down fuels) and Fire Behavior Data**

Vegetative Zones	Stand Density in (Trees/Acre) Pine/Juniper/Total	Fuel Loading (Tons/Acre) and photo series source	Expected Fire Behavior under severe weather conditions	
			Surface rate of spread in chains (66 feet) per hour (3)	Flame length in feet (3)
<b>Ponderosa Pine Forest</b>	117/259/376	10.0 tons 1-PP-1 (1)	19.5	5.2
<b>Ponderosa Pine Forest adjacent to active irrigation canals</b>	146/229/375	6.0 tons 2-PP-4 (1)	6.0	4.8
<b>Ponderosa Pine Forest adjacent to inactive irrigation canals</b>	207/55/262	15.6 tons 4-PP-3 (1)	6.0	4.8
<b>Ponderosa Pine Forest on lava ridge</b>	149/120/269	0.09 tons WJ03 Interior PNW Western Juniper. (2)	19.5	5.2
<b>Western Juniper Woodlands</b>	106/114/220	0.5 tons WJ04 Interior PNW Western Juniper. (2)	9.8	3.8

- 1) Photo Series for Quantifying Natural Forest Residues in Common Vegetation Types of the Pacific Northwest. USDA Forest Service General Technical Report PNW-105. May 1980.
- 2) Stereo Photo Series for Quantifying Natural Fuels. Volume 1: Mixed-Conifer with Mortality, Western Juniper, Sagebrush, and Grassland Types in the Interior Pacific Northwest. A Publication of the National Wildfire Coordinating Group. July 1998.
- 3) Surface rate of spread and flame length are indicators to fire fighters of the intensity of fire and the type and amount of resources needed to safely fight the fire.

Fire regime describes the frequency and severity at which particular ecosystems burned with naturally occurring wildfires. Ponderosa pine fits into Fire Regime 1 with low intensity wildfires occurring on average every 4 – 28 years. Photographs and fuel model runs of the different vegetation zones are on file at the Prineville BLM office.

### **Non-Motorized Recreation**

There are frequent and various types of recreational use on the 20.66 miles of old roads and user created trails found within the project area. Horseback riding, hiking, dog walking, and mountain biking are the most frequent forms of recreation. The area is used by two Special Recreation Permit (SRP) holders for the purpose of guided horseback riding, mountain biking, and hiking. The primary use season for the commercial permits is May-October, with higher use occurring on the weekends. The SRP holders use the project area for short to moderate length rides on internal loops and also long rides connecting to the Deschutes National Forest and some privately owned lands to the west. The existing trail situation is a loose network of old roads and user-created trails, many of which are redundant, meaning they lead to the same place. Oftentimes trees have fallen across or have overgrown a trail, causing users to create new adjacent routes around the obstacle.

## Access Points

The project area has at least 10 access points created by established roads or trails that lead up to the BLM lands. Many people currently use the access road off of Tumalo Reservoir Road located along the north end of the project area to access the area and park vehicles. Vehicles pulling trailers sometimes use the areas near the TID silt pond to park and turn around. There are also numerous, but less used trails, emanating from adjacent properties on all sides of the project area. Two primary administrative access points are currently in use; the main entrance road off Tumalo Reservoir Road and the road known as “Grave’s Driveway” located on the east side of the project area.

## Wildlife Habitat

### Mule Deer

The project area lies within the east edge of the Tumalo Winter Range Cooperative Closure area, which limits motorized vehicles to designated routes from December 1 to March 31 annually and is designated for primary wildlife emphasis in the UDRMP. Few deer and tracks have been seen in the project area during field surveys, and there is minimal evidence of browsed shrubs and droppings as would be expected in high use winter range. The existing levels of year-round recreation use, high density of human travel routes and the close proximity of residential properties may be contributing to lower use levels of deer use in the project area. The recreational use includes bicycle, equestrian, and foot travel including dogs off leash. Public recreation in this area, such as horseback riding and mountain biking, are not restricted to trails and can occur cross-country in any location within the project area. Special Recreation Permit (SRP) holders who use the area for commercial bike and horse riding are restricted to specific trails identified in the SRP.

There are 5.45 miles of roads providing motorized access for administrative use including irrigation canal maintenance. There are also over 20 miles of user-created trails in the project area. While the project area is not open to public motorized use, it occurs because the BLM has not placed controls to stop vehicles at existing access points. The irrigation canals and associated roads bisect the 800-acre parcel through the center in both north-south and east-west directions. Use of ROW roads is primarily associated with the April to October irrigation season, and these same roads are occasionally used for BLM administrative purposes. The density of all travel routes in the project area is 16.53 miles per square mile. The guidelines within the UDRMP for motorized route density for deer winter range in primary wildlife emphasis areas is 1.5 miles of motorized routes per square mile or less. The UDRMP did not provide route density guidelines for non-motorized trails.

Habitat fragmentation is the splitting or isolating of patches of similar habitat by roads and/or trails into small sized patches. Fragmentation is measured by comparing the route density, in miles per square mile, and the size of contiguous habitat patches remaining between the routes. Guidance in the UDRMP for Primary Wildlife Emphasis Areas under Objective 4a is to manage for patches 1,000 – 2,000 acres. However, this is unattainable given the project area is approximately 800 acres in size. In Objective W-4d, the UDRMP also provides guidance for these situations and the Tumalo region specifically— to move toward settings in primary emphasis areas where guidelines may not be achievable because of conditions such as fragmented land ownership. The existing situation for wildlife (e.g. mule deer) is highly fragmented habitat.

In general larger, unfragmented patches are preferred because they provide more security and room to avoid predators and disturbance from human activity. Hiding cover (vegetation capable of hiding 90 percent of a deer from 200 feet away) provides security from predators, cover for predators stalking prey, and security from disturbance associated with human activity. When cover is present, the minimum desirable patch size is greater than 6.5 acres because this would allow for a deer to be hidden from all directions. Where shrubs and intermittent trees, but no continuous cover, are present, patch sizes larger than 26 acres would hide a deer in all directions. The fragmentation created by existing routes has resulted in a total of 96 contiguous patches of habitat ranging in size from 0.1 – 83 acres. Of the total patches, 58 percent are 6.5 acres or less in size and 34 percent range between 6.6 and 26 acres. The remaining 7 percent of patches are larger than 26 acres and 2 percent of these are more than 50 acres.

Approximately 75 percent of the project area currently provides hiding cover. The existing dense vegetation and high amounts of down trees provides hiding cover, but limits the low growing palatable shrubs and forbs that deer use for food. Optimal habitat for mule deer is commonly considered as having 40 percent cover (Thomas et al. 1979), although the UDRMP does not specifically identify a target value for hiding cover in the Tumalo area. Guidance is to manage ponderosa pine health and dominance status throughout its historic range and historic condition, while providing a balance of biological needs in an urban/ wildland setting.

#### Bald Eagle

Bald eagles prefer to nest in large, live trees located in areas with little human disturbance. Within a dense stand of mixed pine and juniper on the east side of the project area there is a stick nest constructed in a large ponderosa pine tree between a trail and an irrigation canal. Although a bald eagle has not been seen in the nest, adjacent land owners and BLM staff have observed an adult eagle perched in the adjacent stand on multiple occasions and bald eagle feathers were observed at the base of the tree. Due to this evidence, this analysis will assume the nest is being used by bald eagles during the breeding season.

There is a concern that as juniper and small ponderosa pine increase in density and dominance, this ponderosa pine will become increasingly stressed and susceptible to insects, disease, drought, and fire. This is supported by the numerous large old ponderosa pine trees throughout the project area that have already died to a variety of biotic and abiotic agents.

There are two trails located approximately 50 and 150 feet away and directly south of the nest tree. Both of these trails continue onto private land located approximately 400 feet to the east. These trails are used as a main access route for a SRP holder providing guided horseback rides in the project area, and are also used by other public land visitors. Recreation use occurs year-round, primarily in May through October and decreases in the winter time with inclement weather. The nest tree is situated to the north of a scabby flat, with few trees providing visual screening to the south for approximately 500 feet. There is vegetation (trees) providing screening from other directions.

#### Migratory and Resident Birds of Conservation Concern

Executive Order 13186 (66 Fed. Reg. 3853, January 17, 2001) "Responsibilities of Federal Agencies to Protect Migratory Birds" directs federal agencies to avoid or minimize the negative impact of their actions on migratory birds, and to take active steps to protect birds and their habitat. This Executive Order also requires federal agencies to develop Memorandum of Understandings (MOU) with the FWS to conserve birds including taking steps to restore and enhance habitat, and incorporating migratory bird conservation into agency planning processes. The BLM has completed a MOU and is currently implementing provisions included in the MOU with the USFWS such as:

- At the project level, evaluate the effects of the BLM's actions on migratory birds during the NEPA process, if any, and focusing first on species of concern, priority habitats, and key risk factors.
- Integrate migratory bird conservation measures, as applicable, into future Activity Management Planning. This will address habitat loss and minimize negative impacts.

The appropriate Bird Conservation Plan and Birds of Conservation Concern (BCC) species list, developed by the U.S. Fish and Wildlife Service (USFWS), for the project area was reviewed. Those species and habitats that are within the project area are incorporated and effects disclosed in this analysis. Table 4 displays a list of the BCC that are known or likely to be present in the Planning Area and their habitats that could be affected by the proposed actions. Bird Conservation Regions (BCRs) were developed based on similar geographic parameters. One BCR encompasses the project area, BCR 9 (Great Basin.), and is displayed in the map below (Figure 1).

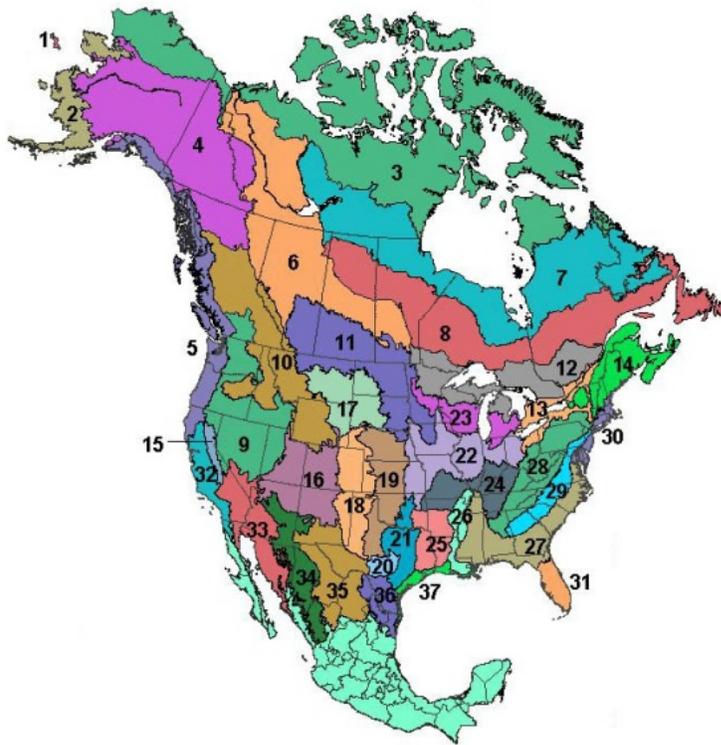


Figure 1. Bird Conservation Regions (BCRs) and are ecologically distinct regions in North America with similar bird communities, habitats, and resource management issues.

**Table 4. Birds of Conservation Concern (U.S. Fish & Wildlife Service)**

Bird Species	Preferred Habitat
Lewis's Woodpecker	Ponderosa Pine, Cottonwood riparian or Oak habitats with an open canopy, brushy understory, dead and down material, available perches and abundant insects.
Williamson's Sapsucker	E. Cascades, mid to high elevation, mature open and mixed coniferous - deciduous forests. Snags are a critical component.
White-headed Woodpecker	Mixed conifer forests (< 40 % canopy cover) dominated by old growth Ponderosa Pine and open habitats where standing snags and scattered tall trees remain.
Willow Flycatcher	Associated with riparian shrub dominated habitats, especially brushy/willow thickets. In SE WA also found in xeric brushy uplands.
Loggerhead Shrike	Inhabits grasslands, pastures with fence rows, agricultural fields, sagebrush with scattered juniper and open woodlands. Requires elevated perches throughout for hunting and nesting.
Pinyon Jay	In OR, pinyon-juniper woodland, sagebrush, and scrub oak habitats.
Sage Thrasher	A sagebrush obligate dependent on large patches and expanses of sagebrush steppe and bitterbrush with shrub heights in the 30 -60 cm height. Prefers bare ground over grassy understories.
Green-tailed Towhee	In Oregon, prefers vigorous shrub stands with high shrub species diversity interspersed with trees.
Brewer's Sparrow	A sagebrush obligate found in shrublands of contiguous big sagebrush, greasewood, rabbitbrush, and shadescale habitats.
Golden Eagle	Inhabits shrub-steppe, grassland, juniper and open ponderosa pine and mixed conifer/deciduous habitats preferring areas with open shrub component for foraging.
Flammulated Owl	Associated with ponderosa pine forests and mixed conifer stands with a mean 67% canopy closure, open understory with dense patches of saplings or shrubs.
Northern Goshawk	Goshawks are forest birds (typically coniferous) and prefer large patches of late-successional forests with large trees and moderate to high canopy closure. In ponderosa pine woodlands of the Blue Mountains, they are found in more open situations.
Bald Eagle	Associated with large bodies of water, forested areas near the ocean, along rivers, and at estuaries, lakes and reservoirs.

## Chapter 4 Environmental Effects

### Introduction

The effects are the known and predicted effects from implementation of the actions, limited to the identified issues. Direct effects are those caused by the action and occurring at the same time and place. Indirect effects are those caused by the action but occurring later or in a different location. Cumulative effects result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. The cumulative effects analysis includes other BLM actions, other Federal actions, and non-Federal (including private) actions. Reasonably foreseeable future actions are those for which there are existing decisions, funding, formal proposals, or which are highly probable, based on known opportunities or trends.

### Assumptions

The Tumalo Feed Canal and lateral ditches will be piped within the next 10 years and subsurface water availability from seepage will be reduced.

Additional residential development will occur on private land adjacent to the north and east sides of the project area.

Central Oregon will continue to grow in population and public demand for recreational use of public lands will continue to increase proportionately.

There have been numerous large wildlives within 20 miles of the project area in the last 20 years. Additional large wildfires will continue to occur in the future. Aggressive fire suppression efforts will continue in this wildland-urban interface.

### Effects on Forest Health

Forest health includes resiliency to insects, disease, drought and wildfire. Generally, relative resistance to these damaging agents is lower when the number of trees per acre is higher than the historic density or natural biological carrying capacity of the site. Therefore, this analysis uses trees per acre as one measurable indicator of forest health. The acres treated and trees per acre are listed by alternative in Table 5. For this analysis in this project area, forest health will be considered “good” (or improving) when basal area is in the range of 60-80 square feet per acre and “fair or poor” when the basal area exceeds 80 square feet per acre (see Chapter 2 - Alternatives for a discussion of basal area). Density, by itself, is not a direct characteristic of forest health, but rather, it provides an objective, measurable indicator of forest health recovery as an expected future result of restoration treatments.

#### Alternative 1

Alternative 1 would not reduce the density and competition among trees across the project area and forest health would continue to decline. Current density ranges up to 376 trees per acre. Barring a wildfire event, or insect/disease outbreak, overstocked stands would continue to increase on an area basis and may continue to increase in tree density, possibly approaching 500 trees per acre in the canal seepage areas in a few decades if left untreated. Unnaturally dense stands would continue to exhibit stress and high mortality. Trees would continue to be susceptible to insects, disease, drought and wildfire. Historic conditions would not be restored. The existing old growth trees would not be protected from fire, drought, insects and disease and would continue to die at an unnaturally high rate. Additional late successional structure would not be allowed to develop. Understory plant community diversity and productivity would decline. If no wildfire occurs, the current stands of ponderosa pine would further decline in health and vigor and ladder fuels would continue to increase. Juniper and small pine trees would continue to increase in density and dominance. If wildfire occurs, stand replacing fire behavior is likely. Stand replacing wildfire is an extremely intense burn resulting in mortality of nearly all trees and other vegetation, altered replacement ecosystems (different from the current structure and species composition), and potential long-term damage to wildlife habitat, aesthetics, watershed and soils.

### **Alternative 2**

Alternative 2 would reduce the density and competition in stands within the 687-725 acres of treatment area. Thinning from 262-376 TPA to a density of 70-134 TPA would improve forest health. The thinned stands would show less stress from competition and be less susceptible to fire, drought, insects and disease. Combining the thinning treatments with prescribed fire would mimic natural cycles of frequent low-intensity fire and allow a transition toward historic conditions and structure. By removing adjacent ladder fuels the existing mature and old-growth ponderosa pine and juniper would be less prone to damage by wildfire. Additional late successional structure would develop over time. The understory plant community (shrubs, grasses and forbs) composition, diversity and productivity would increase.

### **Alternative 3**

Alternative 3 would have the same effects as Alternative 2 except that fewer acres would be treated, 458- 572 acres compared to 687-725 acres in Alternative 2. The untreated acres would show the same effects as in Alternative 1. Within the 191 to 305 untreated acres, forest health would continue to decline, heavy fuel loading would remain, and the potential for stand replacement fire and loss of large and old ponderosa pine and juniper would still exist in and adjacent to untreated areas.

## **Effects on Public Safety (Fuel Loading and Fire Behavior)**

The indicators for analysis are the tons per acre of dead and down fuels, the surface rate of spread, and flame lengths. Dead and down fuels affect the intensity of a fire and the types of resources that are needed to extinguish the fire. The higher the intensity, the less effective hand crews and engines will be and more costly resources will be needed to suppress a fire (e.g. dozers, retardant planes). The desired fuel loading is less than 5 tons per acre. Surface rate of spread helps indicate the number and types of resources needed to catch a fire [production rates of a 20 person hand crew in this fuel type is approximately 4-6 chains (one chain is 66 ft.) per hour and an engine crew of three people is 12 chains per hour]. Desirable rate of spread is less than six chains per hour. Flame lengths (FL) help determine what type of resources would be the most effective in extinguishing a fire. For example, a fire producing flame lengths up to four feet can be managed by hand crews and engines. Fires producing eight foot flame lengths require heavy machinery to manage, and flames lengths greater than eight feet require aerial resources. Fuel load conditions that would produce flame lengths less than or equal to four feet is our desired condition. The indicators are listed by alternative in Table 5.

### **Alternative 1**

Alternative 1 would allow the current and future fuel loads and expected fire behavior to remain at extreme levels and the desirable conditions will not be met for safe and successful fire suppression. Over the next several years, fuel loads and green ladder fuels would continue to gradually increase to the point that a fire start would almost be impossible to suppress quickly and a stand replacing fire event becomes more probable. Fire hazard and risk to adjacent homes would remain high. The risk of crown fire would remain moderate to high in the pine stands. The risk of long range spotting would remain high in some pine stands. Spread rates and flame lengths would be high. The high hazards would contribute to fire behaviors where firefighters would not be safe and successful in suppression efforts under hot, dry summer weather conditions

### **Alternative 2**

Alternative 2 would reduce the current fuel loads and expected fire behavior on 687-725 acres. The risk of crown fire would be reduced to low. Surface fires would remain on the ground with low to moderate flame lengths. Spotting potential would be moderate. Live and dead vegetation would be managed so that a wildland fire would burn with fire behavior where firefighters can be safe and successful in suppression efforts under hot, dry summer weather conditions. Desirable level of fuel loadings, rate of spread and flame lengths would be met in areas treated in Alternative 2. Untreated acres would have the same effects as Alternative 1.

### **Alternative 3**

Alternative 3 would have the same effects as in Alternative 2, except that fewer acres would be treated, 458-572 acres compared to 687-725 acres treated in Alternative 2. Desirable level of fuel loadings, rate of spread and flame lengths would be met in areas treated in Alternative 3. Untreated acres would have the same effects as in Alternative 1. The potential for spotting and spread from untreated areas into treated areas and into private land would be higher than in Alternative 2.

**Table 5. Comparison of Vegetative Zones, Fuel Loads and Expected Fire Behaviors**

	Alternative 1	Alternative 2 & 3
<b>Vegetative Zones</b>	<b>Fuel loading and expected fire behavior* under severe weather conditions. No acres treated.</b> Surface rate of spread in chains (66 feet) per hour. Flame length in feet.	<b>Fuel loading and expected fire behavior* under severe weather conditions.</b> Alternative 2 treats 687-725 acres; Alternative 3 treats 458-572 acres.
<b>Ponderosa pine Forest</b>	10 tons/acre Rate of Spread 19.5 ch/hr Flame Length 5.2 ft,	<5 tons/acre Rate of Spread 4.8 ch/hr Flame Length 2.5 ft
<b>Ponderosa pine forest adjacent to active irrigation canals (including feeder canals)</b>	6 tons/acre Rate of Spread 6.0 ch/hr Flame Length 4.8 ft	<5 tons/acre Rate of Spread 4.8 ch/hr Flame Length 2.5 ft
<b>Ponderosa pine forest adjacent to inactive canals</b>	15.6 tons/acre Rate of Spread 6.0 ch/hr Flame Length 4.8 ft	<5 tons/acre Rate of Spread 4.8 ch/hr Flame Length 2.5 ft
<b>Ponderosa pine forest on lava ridge</b>	0.09 tons/acre Rate of Spread 19.5 ch/hr Flame Length 5.2 ft	<0.09 tons/acre Rate of Spread 5.9 ch/hr Flame Length 2.4 ft
<b>Western juniper woodlands</b>	0.5 tons per/acre Rate of Spread 9.8 ch/hr Flame Length 3.8 ft	<0.5 tons per/acre Rate of Spread 2.7 ch/hr Flame Length 1.7 ft

\* The Fire Behavior is based on fire behavior modeling using BehavePlus 5.0.1 program. Complete analysis models are on file at the Prineville BLM office.

## Effects on Non-motorized Recreation during Implementation

The indicators for analysis of effects of the proposed action on recreation are the amount of time and amount (acres) of the project area with restricted access during implementation.

### Alternative 1

Alternative 1 would not change the existing condition of trails or time available for public use. The entire project area would be available year round for recreational activities.

### Alternative 2

In order to implement the vegetation management activities, Alternative 2 would limit public visitation in the active operations on up to 33 percent of the project area during implementation. This active treatment area would be closed mainly during the work week from 7:00 am to 6:00 pm. Public land visitors would still be able to enter this area after work hours and on weekends. Approximately 66 percent of the project area would remain open throughout the year, even during implementation of the vegetation treatments.

Alternative 2 would also close approximately 80 acres, including 1/3 mile of trail to public land visitation for up to eight months (January 1 to August 31) of the year in order to protect nesting bald eagles. This closure would be lifted earlier when the eagles either finish nesting or fail to nest. During the period mid-May to mid-July, a determination would be made as to whether eagles are either not nesting or have completed nesting. However, the closure period allows for the success of late nesters. The seasonal closure for nesting eagles is independent of, and in addition to, the operational closure for vegetation management.

In order to provide for public safety, portions of the active treatment area would be closed during evenings and on weekends. When this occurs, BLM would sign the area and post information on the BLM web-site describing the location of the closure area and duration this action would be in effect.

### **Alternative 3**

Alternative 3 would have the same effects as Alternative 2 except that the non-operating season would be four months and the restriction would affect public access for eight months.

The trail near the eagle nest would be closed permanently and would not be part of the designated trail system. As described in Alternative 2, Alternative 3 would also have the 80-acre area closure to protect nesting bald eagles.

## **Effects on Access Points**

The indicator for analysis of effects of the proposed action on recreation access is the number of access points and available parking within the project area.

### **Alternative 1**

Alternative 1 would not change the current number or location of access points. There are currently 14 access points that are on existing roads and trails and numerous other access points that are less used. There would be no designated vehicle parking within the project area.

### **Alternative 2**

Seven to ten access points would be designated as part of the trail system. Accesses points would be managed with vehicle gates, fencing and associated equestrian/biker/hiker bypasses on administrative roads or in areas where past vehicle use has made it easily passible by motorized vehicles. Other open trails would be controlled with signs and natural barriers. Some lesser-used access from the west would be closed and camouflaged.

Although there would be a reduction in the number of access points and total trail mileage, recreation opportunities would not be reduced. The 800 acre parcel has a network of old roads and trails, many of which are redundant, meaning they lead to the same place or they have had trees fall across or have overgrown causing users to create new routes. There would still be the same opportunities for non-motorized recreation in the form of out and back trail use, small loops inside the parcel and the ability to connect to the Deschutes National Forest and other large ownerships for longer distance trail use.

No parking area or trailhead would be constructed within the project area and there would be no available vehicle parking within the project area.

The main BLM road access at Tumalo Reservoir Road and at Grave's Driveway would be gated. Administrative access would continue at these roads.

### **Alternative 3**

Alternative 3 would be the same as Alternative 2 in that seven to ten access points would be designated as part of the trail system. Access points would be managed in the same way as in Alternative 2.

Alternative 3 would allow the construction of a small parking area and trailhead to be located at the north end of the parcel with access from Tumalo Reservoir Road. This parking area would be fenced and the BLM road would be gated. Administrative access would continue at this road access and at the gated Grave's Driveway.

## **Effects on Mule Deer Hiding Cover**

The Oregon Department of Fish and Wildlife identified providing 40 percent hiding cover as an issue for this project area. Thomas (1979) states 40 percent cover and 60 percent forage is necessary for optimal mule deer habitat in the Blue Mountains of Oregon. Management guidance in the UDRMP for the La Pine block is to retain 40 percent hiding cover. There is no hiding cover guidance in the UDRMP for the Tumalo area; however, the threshold of 40 percent cover is used for this analysis. The indicator for analysis of effects of the proposed action on mule deer hiding cover is the percent of dense vegetation that could hide 90 percent of a deer from view at a distance of 200 feet.

### **Alternative 1**

Alternative 1 (no action) would retain the current estimated 70-80 percent hiding cover across the project area. This condition is expected to continue for the foreseeable future. Assuming a threshold of 40 percent cover, the project area has 30-40 percent more cover than is needed. The high density of trees is contributing to the surplus of hiding cover which limits sunlight and availability of water and nutrients needed to encourage growth and increased palatability of shrubs, grass and forbs for forage.

### **Alternative 2**

Alternative 2 would result in approximately 5-10 percent hiding cover post-treatment. This cover would be in larger untreated leave areas and clumps of healthy understory trees up to one acre in size within treated areas. This would be less than the 40 percent threshold. After the treatment, increased sunlight exposure to the understory would be expected to increase growth and vigor of shrubs, grasses and forbs, and tree saplings. Increased growth of fuller, healthier shrubs and tree seedlings and saplings would contribute to an increase in higher quality hiding cover over time, particularly in the more productive ponderosa pine sites that would benefit from subsurface irrigation adjacent to canals and ditches. Initially, increased cover would be provided by vigorous shrub growth, followed by infill from tree seedlings and saplings. In 5-10 years we would expect cover to increase to 30-35 percent.

### **Alternative 3**

Alternative 3 would provide 25-40 percent hiding cover post-treatment; more cover than Alternative 2 but less than Alternative 1. The cover would consist of the same structure as described in Alternative 2 and the remaining 20-30 percent of hiding cover would result from areas identified on the ground to retain from treatment. These areas would be comprised of dense stands that provide hiding cover for deer, located throughout the project area away from trails and would range from 1-30 acres in size. In 5-10 years we would expect cover to increase to 40-50 percent, for the same reasons as in Alternative 2.

## **Effects on Habitat Fragmentation**

The indicators for analysis of effects of the proposed action on wildlife habitat (e.g. deer) would be the percent of patches in different size ranges, route density in miles of routes per square mile and travel restrictions (limiting bike and horse travel to designated routes).

Guidance in the UDRMP for Primary Wildlife Emphasis Areas under Objective 4a is to manage for un-fragmented habitat patches 1,000 – 2,000 acres in size. However, this is unattainable given the project area is approximately 800 acres in size and BLM owns few acres in this area. In Objective W-4d, the UDRMP also provides guidance for these situations and the Tumalo region specifically— “to manage toward guidelines in primary emphasis areas where guidelines may not be achievable because of conditions such as fragmented land ownership...” For purposes of this analysis the suitability index for patches is as follows: un-fragmented habitat patches less than 6.5 would be unsuitable; patches from 6.5 acres to 26 acres would be the minimum size considered suitable; patches 26 to 50 acres in size would provide a moderate size, and patches greater than 50 acres are considered large and

would provide for a high amount of occupation by wildlife. The desired outcome would be to have at least 50 percent of the area in suitable patch sizes of which at least one third would be in large patch sizes, approximately one third in moderate and no more than one third in minimum size patches.

#### **Alternative 1**

Alternative 1 would provide the highest amount of habitat fragmentation. There are a total of 96 patches ranging in size between 0.1 and 83 acres. Of the total patches, 58 percent are unsuitable (less than 6.5 acres) 6.5 acres or less in size and 34 percent range between 6.6 and 26 acres have minimum suitability (6.5 – 26 acres). The remaining seven percent comes from 5 percent with moderate (26 – 50 acres) and two percent with high (greater than 50 acres) suitability. Of patches are larger than 26 acres and two percent of these are more than 50 acres. There would be 16.5 miles per square mile of linear travel routes. Travel for foot, bicycle, and equestrian use would not be restricted to designated routes decreasing the ability for mule deer to predict activity and providing the opportunity for users to create new trails resulting in increased route density.

#### **Alternative 2**

Alternative 2 would decrease habitat fragmentation compared to Alternative 1. The designation of trails would create larger patches and decrease route density. There would be a total of 34 patches, 32 percent would be 6.5 acres or less in size and 35 percent would range between 6.6 and 26 acres. The remaining 33 percent of patches would be larger than 26 acres and 15 percent of these would be more than 50 acres.

Route density would be 10 miles per square mile. Equestrian and bicycle use would be restricted to travel on designated trails increasing the ability for mule deer to predict activity and decreasing the likelihood of new trails being created resulting in retention of target route density.

#### **Alternative 3**

Alternative 3 would decrease fragmentation similar to the effects in Alternative 2; however, travel would be unrestricted to foot, bicycle, and equestrian use. This alternative would not designate a ¼ mile length of trail adjacent to the eagle nest, reducing the route density to 9.7 miles per square mile, thus combining two smaller patches (40 acres each) into one larger patch (80 acres). There would be a total of 33 patches. Of the total patches, 33 percent would be 6.5 acres or less in size and 36 percent would range between 6.6 and 26 acres. The remaining 30 percent of patches would be larger than 26 acres and 18 percent of these would be more than 50 acres.

Travel for all users would not be restricted to designated routes decreasing the ability for mule deer to predict activity and providing the opportunity for users to create new trails resulting in increased route density.

### **Effects on Bald Eagle Nesting**

There are three issues used to analyze the effects to nesting bald eagles: forest health (such as, potential for disease and insect outbreak to the nest tree and surrounding stand), risk of nest tree mortality due to wildfire, and human activity disturbing nesting eagles. The indicator for forest health is basal area. As described in Chapter 4, a basal area of 60 – 80 is considered “good” forest health and basal areas that exceed 80 are considered “fair to poor” in this dry site. Fuel modeling software was used to generate the percent risk of mortality to the nest tree if a wildfire were to occur and any amount of risk unacceptable. The distance of human activity to the nest during the breeding season will be used as an indicator of disturbance. The National Bald Eagle Management Guidelines (2007) recommend a minimum buffer of 330 feet of non-motorized activity from a nest site to avoid disturbance.

#### **Alternative 1**

Alternative 1 would not implement vegetative treatments allowing the stand and the nest tree to be susceptible to disease, drought and fire. Forest health would remain “poor” with a basal area of 242 and there would be a nine percent chance of nest tree mortality if a wildfire were to occur. This alternative would have no seasonal closure for nesting bald eagles; therefore, human activity could occur in close proximity (within 330 feet) of the nest tree.

Allowing human activity to occur within close proximity of the nest tree during the breeding season (Jan 1 – Aug 31st), would cause disturbance to the nesting eagles and potentially reduce their breeding productivity.

**Alternative 2**

Alternative 2 would implement vegetation treatments to improve forest health, reduce risks from wildfire and protect nesting eagles from disturbance caused by human activity. Thinning to a range of 60 to 80 basal area would result in a good condition regarding forest health. This alternative would reduce the risk for nest tree mortality resulting from wildfire to near zero, and reduce stand and nest tree susceptibility to insects, disease and drought. A seasonal closure would be implemented prohibiting all entry into an area greater than 330 feet from the nest tree, and would limit human uses during the breeding season within at least approximately 750 feet, including uses on trails. The closure area meets USFWS management recommendations to minimize impacts to nesting bald eagles as described in the National Bald Eagle Management Guidelines, 2007.

**Alternative 3**

Alternative 3 would have the same effects as Alternative 2, except that some large potential nesting and perching trees in untreated areas may be at risk of stress and mortality from insects, disease and fire.

**Effects on Migratory and Resident Birds of Conservation Concern**

**Table 6. Effects Analysis for Birds of Conservation Concern**

Species	General Habitat Requirements	Effects to Species	
		Alternative 1 (No Action)	Alternatives 2 and 3
<b>Lewis’s Woodpecker</b>	Associated with open ponderosa pine woodlands, open canopy, brushy understory, dead and down trees, available perches and abundant insects.	This alternative would not promote suitable habitat conditions for this species.	These alternatives would improve conditions favorable to this species. Project Design Features for retaining dead and down trees would maintain favorable habitat features.
<b>Williamson’s Sapsucker</b>	Associated with mid to high elevation, mature open and mixed coniferous - deciduous forests, including open ponderosa pine forests. Snags are a critical component.	This alternative would not promote suitable habitat conditions for this species.	These alternatives would improve conditions favorable to this species. Project Design Features for retaining dead and down trees would maintain favorable habitat features.
<b>White-headed Woodpecker</b>	Closely associated with ponderosa pine or ponderosa pine-mixed conifer forests. It requires large trees for foraging and snags for nesting, which are characteristic of older forests.	This alternative would not promote suitable habitat conditions, especially the development of large older trees.	These alternatives would promote the health and growth of large diameter ponderosa pine trees desired by this species. Post thinning densities may create less desirable conditions which would be more open than the species prefer. Alternative 3 would retain more acres in existing dense stand conditions, desired by this species, than Alternative 2.

Species	General Habitat Requirements	Effects to Species	
		Alternative 1 (No Action)	Alternatives 2 and 3
<b>Willow Flycatcher</b>	Found in willows at the edges of streams flowing through meadows and marshes, but also breeds in thickets along the edges of forest clearings and, generally in tall, brushy vegetation in the vicinity of water, and uses vegetation around springs and seeps in desert mountain ranges.	This alternative would not promote suitable habitat conditions for this species.	These two alternatives would improve conditions favorable to Willow Flycatchers, especially adjacent to canals, ditches and seeps.
<b>Loggerhead Shrike</b>	Occur in almost any fairly open vegetation type where there are occasional tall shrubs or trees for perching and nesting. This includes parts of sagebrush, bitterbrush, juniper woodlands, very open pine and mountain shrub communities.	This alternative would not promote suitable habitat conditions for this species, mainly in the juniper woodland/shrub-steppe plant community.	These alternatives would promote suitable habitat conditions within the juniper woodlands/shrub-steppe plant communities. Alternative 2 would promote more acres because there would be fewer acres retained in un-thinned clumps and leave areas.
<b>Pinyon Jay</b>	Uses juniper and ponderosa pine woodlands, sagebrush, and scrub oak habitats.	There would be no effects to this species under this alternative. However, potential roosting habitat in large trees would not develop at an accelerated rate (due to thinning) and risk of habitat loss due to wildfire would continue to exist under this alternative.	These alternatives would degrade the suitability of the area for nesting, except for the areas retained in untreated clumps and leave areas. Foraging habitat would be improved especially in the long-term (>10 years), due to improved tree health and increased diversity of the plant species and structure within the woodland plant communities.
<b>Sage Thrasher</b>	Associated with arid desert shrub communities dominated by sagebrush, but is also found in other arid desert communities (e.g., greasewood, saltbush, rabbitbrush). There are also occasional junipers in its sagebrush habitat, but it avoids areas where junipers are dominant.	This alternative would not promote suitable habitat conditions for this species, mainly in the juniper woodland/shrub-steppe plant community.	These alternatives would promote suitable habitat conditions within the juniper woodlands/shrub-steppe plant communities. Alternative 2 would promote more acres because there would be fewer acres retained in un-treated clumps and leave areas.
<b>Green-tailed Towhee</b>	Occupies the undergrowth of sagebrush, bitterbrush, manzanita, mountain mahogany in open ponderosa pine woodlands. Also associated with open juniper woodlands.	This alternative would not promote suitable habitat conditions for this species, especially in the juniper woodland/shrub-steppe plant community.	These alternatives would promote suitable habitat conditions within all plant communities, but especially in the juniper woodlands/shrub-steppe plant communities. Alternative 2 would promote more acres because there would be fewer acres retained in untreated clumps and leave areas.
<b>Brewer's Sparrow</b>	Sagebrush obligate found in shrublands of contiguous big sagebrush, greasewood, rabbitbrush, and shade-scale habitats.	This alternative would not promote suitable habitat conditions for this species, located mainly in the juniper woodland/shrub-steppe plant community.	These alternatives would promote suitable habitat conditions within the juniper woodlands/shrub-steppe plant communities. Alternative 2 would promote more acres because there would be fewer acres retained in untreated clumps and leave areas.
<b>Golden Eagle</b>	Inhabits shrub-steppe, grassland, juniper and open ponderosa pine and mixed conifer/deciduous habitats. Prefers areas with open shrub component for foraging. Typically nests on cliffs and in large trees.	This alternative would not promote suitable habitat conditions for this species. High density of trees would limit the stand's ability to produce large older trees suitable for nesting and would limit eagle's	These alternatives would promote suitable habitat conditions within all plant communities. Thinning proposed in Alternatives 2 and 3 would reduce competition between trees and allow the larger, healthier trees survive and grow larger. These alternatives would also open up canopies and improve foraging conditions for golden eagles.

Species	General Habitat Requirements	Effects to Species	
		Alternative 1 (No Action)	Alternatives 2 and 3
		ability to forage on ground dwelling prey. High densities of trees would stress large older trees and make them vulnerable to disease and loss to wildfire.	Alternative 2 would promote more acres because there would be fewer acres retained in untreated clumps and leave areas.
<b>Flammulated Owl</b>	In Oregon, the flammulated owl is closely associated with open forests that have a ponderosa pine component. It requires fairly large trees for roosting that are adjacent to patches of grasslands or meadows, where it forages.	This alternative would not promote suitable habitat conditions for this species.	These alternatives would promote suitable habitat conditions within all plant communities. Thinning proposed in Alternatives 2 and 3 would reduce competition between trees and encourage larger, healthier trees survive and grow larger. Alternative 2 would promote more acres because there would be fewer acres retained in untreated clumps and leave areas.
<b>Northern Goshawk</b>	Goshawks are forest birds (typically coniferous) and prefer large patches of late-successional forests with large trees and moderate to high canopy closure. In ponderosa pine woodlands of the Blue Mountains, they are found in more open situations.	Stands would continue to provide some suitable nesting and foraging habitat. The existing stand conditions are dense, limiting travel throughout the area. Also, because of high human use on a high density of travel routes, true nesting opportunities would be limited.	The treatments would open up the understory component of the forest while maintaining untreated patches throughout. Untreated suitable habitat would remain dispersed throughout the area yet the treatments will have the potential to improve habitat suitability throughout the overstocked areas. Limiting human use on designated trails would decrease habitat fragmentation and increase nesting opportunities.
<b>Bald Eagle</b>	Associated with large bodies of water, forested areas near the ocean, along rivers, and at estuaries, lakes and reservoirs.	See individual effects analysis.	See individual effects analysis.

## Summary of effects

Table 7. Summary of Effects for Issues Analyzed in Detail

	Indicator	Alternative 1	Alternative 2	Alternative 3
<b>Forest Health</b>	Acres Treated	0	687-725	458-572
<b>Ponderosa Pine</b>	Trees per Acre	262-376	70-134	70-134
<b>Ponderosa Pine</b>	Basal Area	115-242	60-80	60-80
<b>Western Juniper</b>	Trees per Acre	150-220	10-48	10-48
<b>Western Juniper</b>	Basal Area	100-128	20-60	20-60
<b>Public Safety</b>	See Table 4 above			
<b>Access During Implementation</b>	Amount of time with restricted access and amount of area restricted	NA	33% of area during 10 months of active operations (100% open evenings/ weekends)	33% of area during 8 months of active operations (100% open evenings and weekends)
<b>Access points</b>	Number of access points	14	10	10
	Designated parking area	No	No	Yes
	Designated Non-Motorized Trail System	No	Yes (10 to 13 Miles)	Yes (10 to 13 Miles)
<b>Mule Deer Hiding Cover</b>	Percent of area containing hiding cover	70-80	5-10	25-40
<b>Habitat Fragmentation</b>	Suitability of patch sizes, percent present	5-20 acres - 40% 20-40 acres - 50%	5-20 acres - 20% 20-40 acres - 60%	5-20 acres - 20% 20-40 acres - 60%

		>80 acres - 10%	>80 acres - 20%	>80 acres - 20%
	route density per square mile	16.53	10.01	9.73
	Equestrian and Bicycles limited to designated trails	No	Yes	No
<b>Eagle Nest</b>	Forest Health	Poor	Good	Good
	Risk of nest tree mortality with wildfire	9%	0%	0%
	Human activity present within a distance that can cause disturbance	Yes	No	No

## Cumulative Effects

The current conditions on the lands affected by the proposed action resulted from a multitude of natural and human actions that have taken place over many decades. A catalogue and analysis, comparison, or description of all individual past actions and their effects that have contributed to the current environmental conditions on all ownerships in the analysis area would be difficult to compile and possibly inaccurate or incomplete. The description of the current affected environment inherently includes the effects of past actions and serves as a more accurate and useful starting point for a cumulative effects analysis, than attempting to establish such a starting point by “adding up” the described effects of individual past actions. Reasonably foreseeable future actions in the project area include: piping the Tumalo Feed Canal and lateral ditches within the next 10 years, additional residential development on private land bordering the north and east sides of the project area, continued population growth and recreational demand for public lands, and additional large wildfires occurring in the area. The BLM has consulted with a number of other landowners in the larger analysis area and has incorporated information regarding some past, present and reasonably foreseeable future actions. The cumulative effects description below was not separated out by alternative due to the nature of cumulative effects being in a larger spatial and temporal context. Where there were differences between alternatives for cumulative effects, those differences were noted in the discussion below.

### Cumulative Effects on Forest Health

There are currently no additional BLM projects proposed for the project area in the immediate future. A reasonably foreseeable action on BLM-administered land in the remainder of the 5,589 acre Tumalo block located west of Highway 20 and north of the project area would include thinning around individual large ponderosa pine trees and thinning selected units targeting removal of young juniper for sagebrush-steppe restoration and additional fire protection. Forest Service proposed projects in the vicinity, such as Sisters Area Fuel Reduction and West Bend, will likely be developed and implemented in the next several years, adding to the overall general health of the federally-managed forest between Bend and Sisters. However, all forests are dynamic and, without active management such as regular periodic thinning and prescribed fire, currently healthy stands will become more dense, insects and disease will increase, and forest health will decline in the untreated areas. Approximately 1.3 miles of the Tumalo Feed Canal within the project area would be piped, as well as most or all of the lateral ditches. When this occurs the adjacent deep rooted woody species such as ponderosa pine, juniper and hardwoods, as well as riparian grasses, sedges and forbs, will respond to the decreased seepage with increased stress and mortality.

### Cumulative Effects on Public Safety (Fuel Loading and Fire Behavior)

There are currently no additional BLM projects proposed for the project area in the immediate future. If the current proposed project (Alternative 2 or 3) is implemented, within 10-15 years fuels maintenance treatments would likely be proposed again within the project area. These treatments would be implemented in areas adjacent to homes and major roads and would likely include chainsaw cutting of small trees, piling slash, burning piles, and/or mulching of brush and slash. Without such treatments, fuel loading would continue to build and an

unacceptable fire hazard would develop again. Fire risk and management in the wildland-urban interface would continue to be a priority, especially with continued population growth and increasing recreational use of public lands. Assuming implementation of the current proposed project and future maintenance projects, a fire protection buffer zone of 500-600 feet adjacent to homes would likely be maintained in perpetuity, subject to BLM funding. Continued future BLM fuels treatments in the wildland-urban interface would be consistent with the local Community Wildfire Protection Plans. There have been fuels reduction treatments on adjacent private lands in the last few years. Private landowners would likely continue to treat their own lands adjacent to the BLM in the future. BLM maintenance treatments would complement these private treatments for a more effective fuel break, slowing fire spread in either direction. Piping of the canal and ditches will induce more stress and mortality in the pine trees, resulting in additional fuel loading, going from the existing six tons per acre toward 15.6 tons per acre (the current fuel loading on the inactive Columbia Southern Canal).

### **Cumulative Effects on Non-motorized Recreation during Implementation**

Future fuels treatment maintenance activities would require short duration public land closures in relatively small selected project areas during active operations such as cutting, mulching and pile burning.

### **Cumulative Effects on Access Points**

There are no specific future BLM projects proposed for the area that would affect access points. Assuming expected increases in the Central Oregon population, increases in recreational use of public lands, and continued residential development adjacent to the project area, additional user-created access points and trails could develop. Routine BLM recreation maintenance activities such as blocking new user-created trails, mending fences and gates, and additional signage would help control unauthorized access. Acquisition and development of a proposed community forest on currently owned Cascade Timberlands property to the west of the project area could put additional pressure on the area for access, parking and trail linkages. The current proposed action tried to anticipate long-term needs for trail connections on a broader scale. However, if the community forest becomes a reality, a future cooperative, mixed ownership regional recreation plan could be proposed and implemented which could alter some access points, trailhead locations and parking in the future.

### **Cumulative Effects on Mule Deer Hiding Cover**

For purposes of this analysis, cumulative effects on mule deer hiding cover and route density will be analyzed in the area referred to as the Tumalo Winter Range. This area includes the project area and the winter range in the Upper Deschutes Herd Management Area (HMA), identified by ODFW, south of Highway 20. There are approximately 110,936 acres in the Tumalo Winter Range. Federal lands comprise 45% (50,316 acres) of the total area. The Forest Service administers 40% (44,727 acres) and the BLM administers 5% (5,589 acres). The remaining 55% (60,620 acres) is privately owned, of which 54% (33,000 acres) is Cascades Timberlands (private) forest. The project area represents 0.7% (800 acres) of the Tumalo Winter Range and 14% of the total BLM administered lands in the Tumalo Winter Range.

The amount of hiding cover by alternative is described in the table below. The Deschutes National Forest administered lands in the winter range are dominated by 80-120 year old ponderosa pine forests. Stands of this age have already self-thinned, or are beginning to self-thin their lower branches. The loss of these lower branches and horizontal structure decreases the stand's contribution to hiding cover. However, these stands are providing some cover. An assessment of hiding cover over about 25,000 acres of land managed by the Forest Service in the Tumalo Winter Range estimated 13% hiding cover (Gregg, 2012). Because this assessment only applies to half of the acres of land administered by the Forest Service in the analysis area, this analysis will assume 10% hiding cover exists across these lands because 10% is the management objective for hiding cover in deer winter range as described in the Deschutes National Forest Land Resource Management Plan (Gregg, 2012).

As elevation decreases in the eastern portion of the winter range, the ponderosa pine habitat transitions into sagebrush-steppe and juniper woodlands. This is the dominant habitat type in lands administered by the BLM in the Tumalo Winter Range. The sagebrush-steppe habitat in this range is commonly accompanied by encroaching young juniper varying in size from three to 20 feet tall. Although the spacing and distribution of junipers does not

lend itself to a dense, contiguous stand of hiding cover as expected in higher elevation young pine and fir forests, it does provide some hiding and screening cover across the landscape. There is no quantitative data available to assess hiding cover. Satellite imagery, on the ground observations, and professional experience was used to estimate hiding cover at 35%.

Nearly half (54%) of the private land in the Tumalo Winter Range is Cascade Timberlands forest. The habitat on this land includes ponderosa pine and mixed conifer at higher elevations. Except for an 850 acre thinning project in 2012, there has been little harvesting in the last five years on Cascade Timberlands property. Hiding cover across these lands is approximately 50% (Swarts, 2013). In 2010 the Rooster Rock fire burned nearly 6000 acres, predominately on Cascade Timberlands property. The area is regenerating with shrub and saplings but the stand is still too young to offer much hiding cover. The Rooster Rock fire is the only large (greater than 30 acres) fire that has occurred in the winter range in the last 15 years.

The remaining private lands (46%) in the winter range are characterized by homes on large acre lots. These lands provide a variety of hiding cover depending on the vegetative structure on the land. The northern area is dominated by dry fields, sagebrush and juniper and offers little hiding cover. The central area is dominated by agriculture fields and also offers little cover. The hiding cover increases on private lands in the south with the transition to pine forests. There is no quantitative data available to assess hiding cover. However, satellite imagery, on the ground observations, and professional experience was used to estimate hiding cover at 16%.

There are few actions in the foreseeable future that would contribute to cumulative effects on hiding cover across the Tumalo Winter Range. Foreseeable actions on BLM-administered land in the remainder of the 5,589 acre Tumalo block within the Tumalo Winter Range include thinning around individual large ponderosa pine and thinning selected units targeting removal of young juniper for sagebrush-steppe restoration and additional fire protection. These actions would have little effect on existing hiding cover because most of the current cover on these dry-site shrub-steppe and savanna vegetation types is provided by the shrub layer. On Forest Service administered lands there are two foreseeable projects to consider including the Sisters Area Fuel Reduction (SAFR) project and the West Bend project. Treatments in the SAFR project began in 2008 and are expected to continue until 2018. These treatments will remove vegetative structure on federal lands within 600 feet of private lands. However, these lands are not taken into consideration toward meeting their 10% hiding cover management guideline. As of December 2013 the West Bend Environmental Impact Statement and Record of Decision is in draft form but implementation is expected to occur between 2014 and 2017. This project would include selective thinning, mowing and burning of 419 acres in thermal cover stands to create small group openings. The goal of these openings is to develop highly suitable hiding cover within the next 10 years (USDA Deschutes NF, 2013). There are no harvest actions planned in the foreseeable future on Cascade Timberlands. After ten years of growth, a pine tree can reach heights of six to ten feet tall and is capable of contributing to hiding cover. Regeneration areas can provide hiding cover in as little as five years when shrub and tree structure is combined and if a good amount of precipitation is present to accelerate growth. In 2020, the Rooster Rock fire will have had ten years to regenerate and is conservatively estimated to contribute 50% hiding cover across the 6000 acre area that burned in 2010. Similarly, the 850 acre thinning project in 2012 is estimated to provide 50% hiding cover in 5- 10 years.

### **Cumulative Effects on Habitat Fragmentation**

Due to the proximity of the winter range to urban areas, motorized and non-motorized travel routes are common across the area. However, federal, state and private management activities have been and continue to work towards decreasing route densities and the effect human travel on these routes have on wintering deer. Route density on BLM-administered lands outside of the project area is approximately 4.5 miles per square mile. With the exception of Sisemore Road and a few lateral roads off of Sisemore Road, the routes are restricted to non-motorized use year-round. Using the most current route data available, estimates of route densities on non-BLM administered lands in the Tumalo Winter Range is approximately 3.3 miles per square mile. These routes are a mix of motorized and non-motorized. Densities for roads open to motorized travel on Forest Service administered lands across a portion of the Tumalo Winter Range are 2.8 miles per square miles (Gregg, 2012). Approximately 65% of the Tumalo Winter Range, including nearly all of the federal and private forest lands, is part of the Tumalo

Winter Range Cooperative Closure that restricts motorized use to designated routes from December 1 through March 31 to protect wintering deer. This closure limits public motorized use to main roads including Century Drive, Skyliner Road, Sisemore Road and a few others. There are no known foreseeable actions that would have an effect on route densities. The summary of route density by alternative is described in the table below.

Implementation and enforcement of the motorized vehicle closure with Alternatives 2 and 3, including gates, fencing, permanent barriers and signage, would decrease disturbance and fragmentation caused by recreational use of motorized routes. In addition, reducing the number of miles of open routes for any use, from the existing 20 miles down to 10-12 miles within the project area would also reduce disturbance to wildlife. Alternatives 2 and 3 would allow temporary administrative access for motorized operations within portions of the project area. Alternative 2 has an operating season of August through May and Alternative 3 has an operating season of October through May. These operating seasons would overlap the public closure period during December 1 through March 31. Operations during this four month portion of the season may occur over an estimated 2-3 years during the life of the project. The project design features would limit active operations at any one time to 33 percent of the project area. Operations may only occur on up to 239 acres (33% of 725) at any one time under the highest treatment alternative (Alternative 2). This represents about one fifth of one percent of the total 110,936 acre Tumalo Winter Range. Because of the small area affected relative to the entire Tumalo Winter Range, and since the project is located on the far east edge of the winter range, the effects of winter operations on mobile wintering deer in the area is considered to be low.

### **Cumulative Effects on Bald Eagle Nesting**

Bald eagles often nest within one mile of a body of water that provides suitable foraging opportunities. Large perch trees adjacent to foraging habitat are an important feature allowing eagles to sit and wait for their prey. Tumalo Reservoir is approximately 60 acres and is the closest (1.8 miles) large body of water to the bald eagle nest site in the project area. This source does not provide a prey base of fish, however it does provide suitable habitat for waterfowl. The reservoir and the land around it are owned by Tumalo Irrigation District (TID). The forest around the reservoir includes large trees and snags ideal for perching. The TID has observed 5-6 bald eagles at one time perching adjacent to the reservoir (Rieck, 2014). Approximately 300 acres surrounding the reservoir are closed to motorized access year round. The BLM is not aware of any future actions that would combine with the effects of the proposed actions to impact nesting bald eagles.

### **Cumulative Effects on Migratory and Resident Birds of Conservation Concern**

There are no old growth ponderosa pine stands on federal land or Cascade Timberlands in the Tumalo Winter Range. The Deschutes National Forest is managing young ponderosa pine stands towards old growth. Cascade Timberlands is not managing for old growth ponderosa pine. The area for this analysis includes the Cascades Timberlands because it is the largest contiguous habitat adjacent to the project area. There are no foreseeable actions occurring on these lands, therefore there are no cumulative effects.

### **Cumulative Effects on Other Wildlife Species**

Non-federal lands in the surrounding area are mostly a mixture of private forest lands and small acreage farms, ranches and home sites. These areas often provide some short-term low quality habitat for wildlife species that prefer to occupy mature and older ponderosa pine (e.g. eagles, white-headed woodpecker, etc.), but little high quality or ongoing habitat for these or other species existing on the private lands primarily because most of these lands are young mid-seral age stands with very low amounts of large trees, down logs, snags and late-seral characteristics. These non-federal lands often provide habitat for wildlife that use early-seral stage ponderosa pine, young juniper woodlands and shrub-steppe habitats. Wintering deer and foraging golden eagles likely benefit from land management on the adjacent private forest lands due the early-seral stage conditions. Within the urban interface, human activity, fencing, agriculture, and structural developments likely limit some wildlife due to habitat fragmentation, and/or act as barriers to landscape movements for smaller and less agile wildlife. Mature and older ponderosa pine habitats on non-federal lands are generally not expected to improve within all temporal and spatial scales. Wildlife species that depend on late-seral habitats, including large/mature trees and

abundant snags and down logs, would benefit from long-term federal (USFS and BLM) land management which would retain and promote these habitat characteristics across most of the landscape.

**Table 8. Summary of Cumulative Effects on Habitat Fragmentation**

	Alt 1-No action		Alt 2		Alt 3	
	Short term	Long term	Short term	Long term	Short term	Long term
Hiding cover in TDWR (percent)	25	28	24	28	25	28
Route density in TDWR (mi per sq mi)	3.48	n/a	3.43	n/a	3.43	n/a

For hiding cover, short term is existing condition for Alternative 1 and immediately post-treatment for Alternatives 2 and 3. Long term is considered within 5-10 years.  
 TDWR = Tumalo Deer Winter Range

## **Chapter 5 Public and Other Involvement**

### **Tribes, Individuals, Organizations, or Agencies Consulted**

The BLM first requested input on this project in March of 2012 when it mailed scoping letters to over 80 individuals, state and local agencies, and organizations. At that time the BLM also notified tribal governments including the Burns Paiute Tribe, Confederated Tribes of the Warm Springs Reservation, and The Klamath Tribes. Comments from this scoping period were considered in the design of alternatives. BLM personnel also met with numerous individuals during the scoping process.

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**Mike McKay** - Riparian and Hydrology

**Molly Galbraith** – Grazing

**Jennifer Moffitt** – Soils

**Guy Chamness** – Fuels and Fire

**Mike Kroll** – Realty

**Bill Dean** – Assistant Field Manager

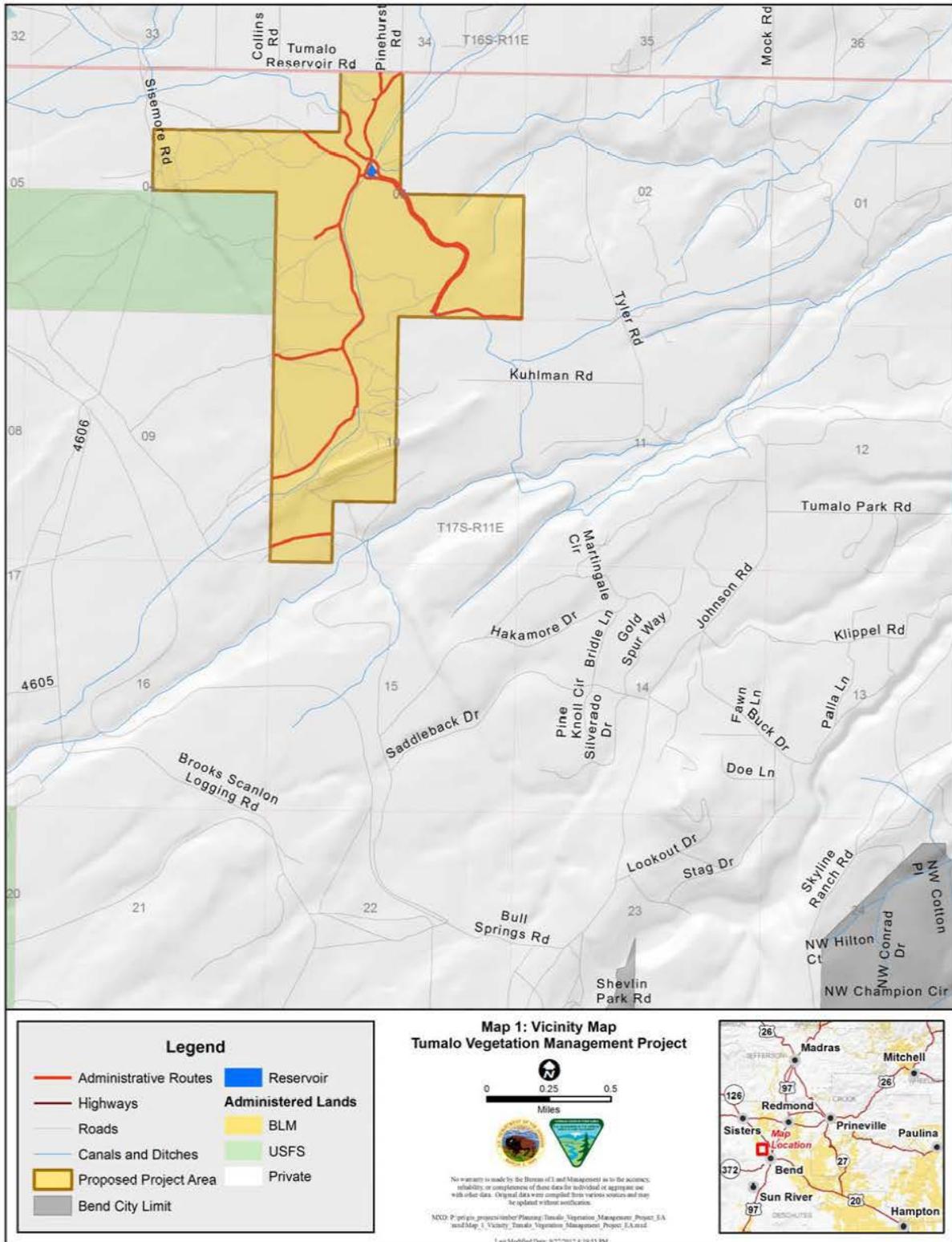
#### **Other**

**Dan Tippy** - Contractor Writer/Editor

## Appendices

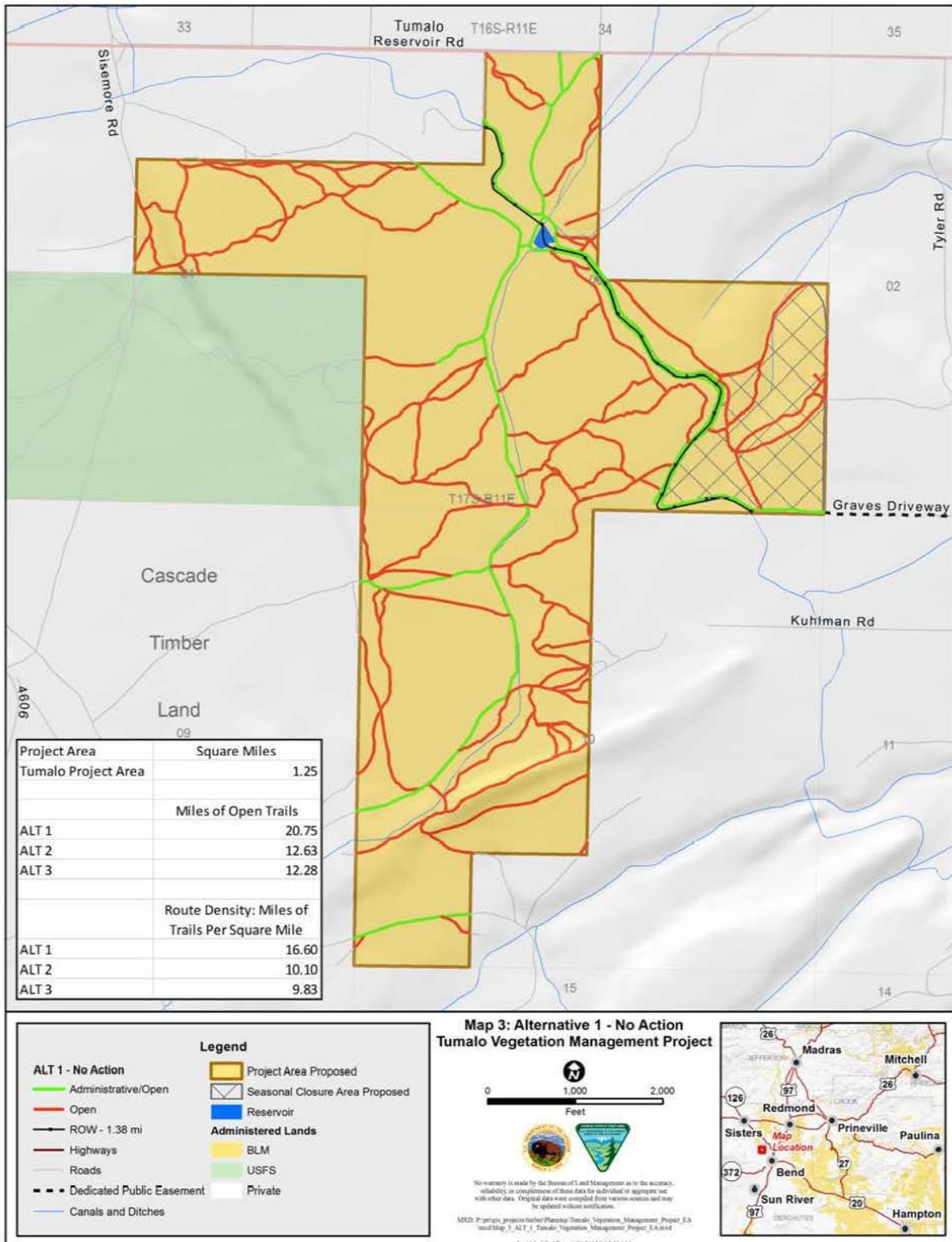
# Appendix A - Maps

## Map 1. Tumalo Vegetation Management Project Location Map

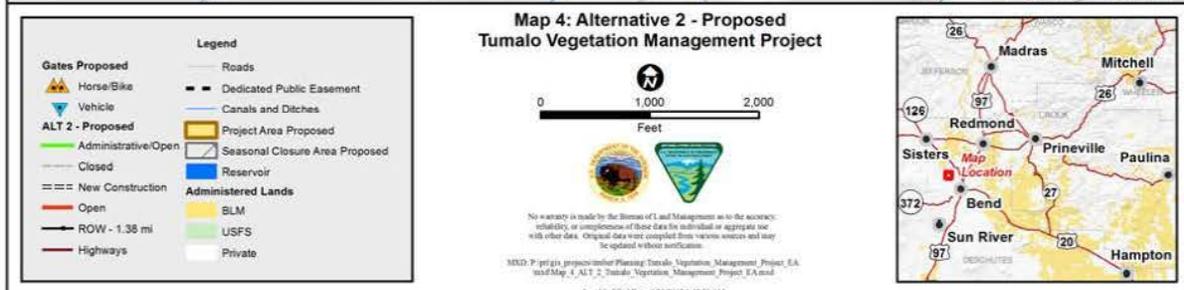
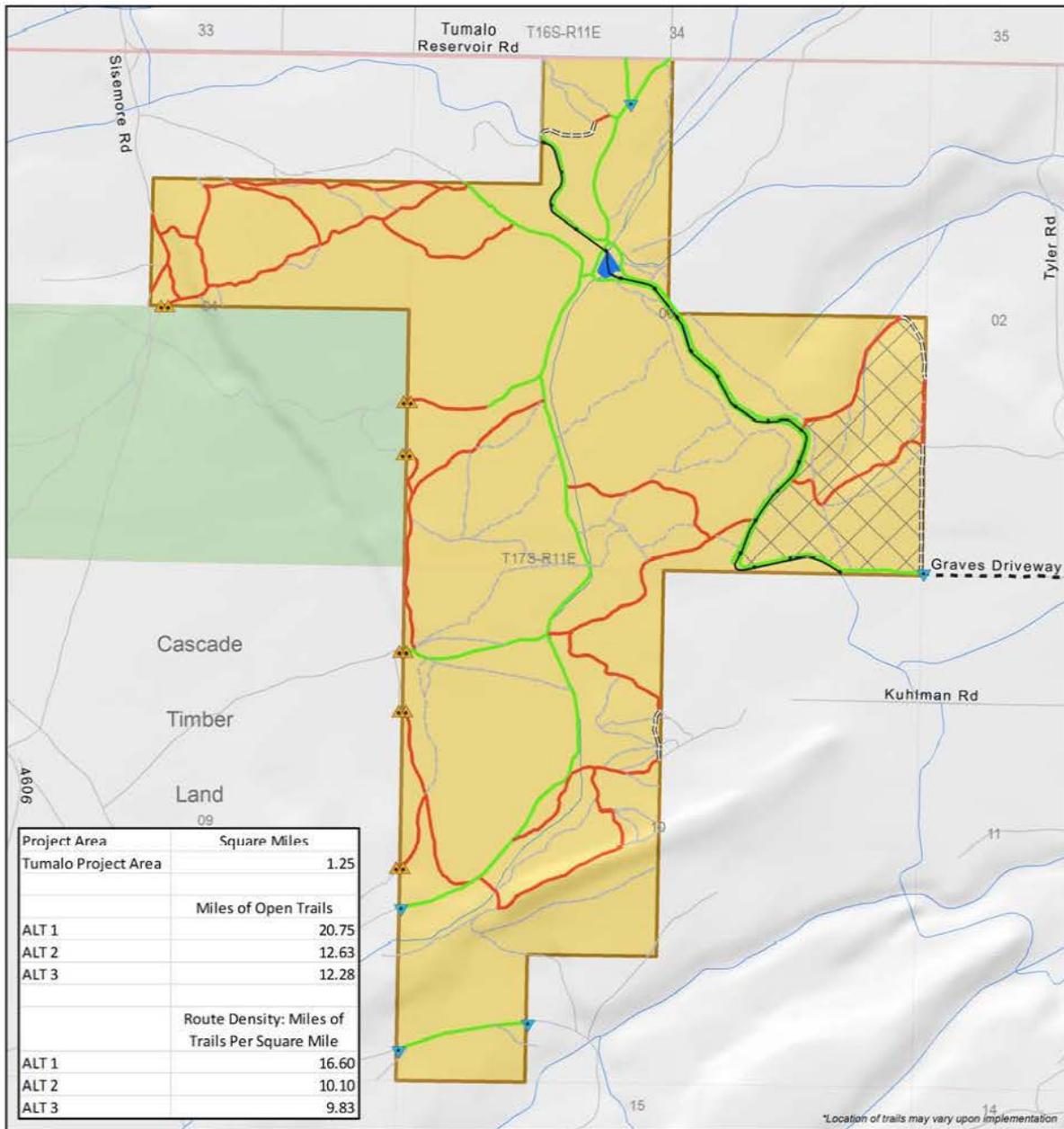




**Map 3. Existing Routes**



Map 4. Alternative 2 Routes





## **Appendix B - Issues Considered but Eliminated from Detailed Analysis**

***How would the burning of slash piles affect air quality and public health?*** There would be no measurable effect from the proposed actions on air quality and public health. The proposed action has project design features that require specific conditions and parameters for prescribed burning that mitigates potential effects. As a result of the project design features being part of the proposed action this issue will not be discussed further in this analysis.

***How would the management of slash piles affect short term fire hazard?*** There would be no measurable effect from the proposed actions on short term fire hazard. The proposed action removes as much of the slash as possible as biomass products resulting in reduced available fuels if a fire were to occur and increased fire fighter safety due to less intense fire. Slash will be managed as described in the project design features. As a result of the project design features being part of the proposed action this issue will not be discussed further in this analysis.

***How would the proposed actions affect visual resources?*** The project area is currently designated as VRM Class III. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. The proposed actions would improve forest health and old growth characteristics to a more natural appearance. As a result of the project design features being part of the proposed action this issue will not be discussed further in this analysis.

***How would the proposed actions affect motorized recreation?*** The project area is currently designated as a non-motorized exclusive recreation emphasis by UDRMP. Motorized use is limited to canal ROW roads by the ROW holder and to BLM for administrative use. Since motorized recreation is not allowed and the proposed action would not change that, this issue will not be discussed further in this analysis.

***How would the alternatives affect habitat fragmentation for small mammals?*** To maintain connectivity for small mammals, all action alternatives would retain 120 lineal feet of large down logs, and six snags per acre in ponderosa pine stands where present. Also, slash produced during treatments would be pulled onto skid trails and temporary roads prior to completion of work. The covering of skid trails and temporary roads would prevent any potentially significant effects to the continuity of wildlife habitat by providing cover and conditions more suitable for new plant development. As a result of these project design features being part of the proposed action there would be no measurable effect on small mammal habitat; therefore this issue will not be discussed further in this analysis.

***What would be the effect of the proposed action on the irrigation canal ROW and associated uses?*** There would be no measurable effect from the proposed actions on the irrigation canal ROW and the allowed uses. The majority of actions would occur outside of the irrigation season when the ROW activities are minimal. The proposed actions have been discussed with the ROW holder. As a result of these project design features being part of the proposed action this issue will not be discussed further in this analysis.

***What would be the effects of loss of soil productivity due to soil loss, displacement, puddling, or compaction caused by vegetation management practices?*** No more than 15 percent of the project area, excluding permanent roads would become compacted or exhibit other forms of detrimental soil disturbance during the proposed treatments. If the total area exhibiting detrimental soil disturbance as a result of initial and subsequent entries is greater than 15 percent of the project area, rehabilitation measures would be taken to reduce disturbance to no more than 15 percent of the project area. Additionally, slopes over 35 percent would not be treated with ground based mechanized equipment. As a result of these project design features being part of the proposed action this issue will not be discussed further in this analysis.

***How would use of dirt roads within the project area to move equipment and haul forest products affect air quality?*** Air quality would not potentially be measurably affected by the action alternatives because during the dry season and when in close proximity to private residences, dust abatement would be performed periodically as necessary by applying water to road surfaces in areas of high activity. As a result of these project design features being part of the proposed action this issue will not be discussed further in this analysis.

***What would be the effect of the proposed actions on water quality?*** There would not be any measurable effects on water quality because canal crossing would be conducted during the non-irrigation season when no water is in the canals. As a result of these project design features being part of the proposed action this issue will not be discussed further in this analysis.

***Would the proposed actions have an effect on cultural properties and paleontological resources?*** All treatments would be designed to avoid disturbance to historic properties and resources. Project design would avoid treatment to sensitive areas or modify treatments to avoid impacts. Any new discoveries of cultural resources during implementation would temporarily stop project activities and the district cultural specialist would be contacted. The project would resume upon completion of assessment and coordination. These project design features would prevent any potentially adverse effects to cultural properties. The action alternatives would result in a finding of no adverse effect because the Tumalo Irrigation System has been determined eligible to the National Register of Historic Places and the canal segments, whether determined contributing or non-contributing, would be protected and retained. As a result of these project design features being part of the proposed action this issue will not be discussed further in this analysis.

***What would be the effects of the proposed action on authorized grazing?*** The project area is part of the Wierleske grazing allotment. There has not been active grazing in recent years due in part to the boundary fences not being functional to keep livestock within the boundaries. If and when adequate fences are constructed or reconstructed livestock grazing may resume. The project area would be rested from livestock grazing for up to two years following a vegetation treatment or pile burning treatment if grazing would interfere with re-establishment of understory vegetation. As a result of project design features, and because active grazing is not occurring in the allotment, or is likely to occur in the next two years, this issue will not be discussed further in this analysis.

***How would the alternatives affect federally listed threatened, endangered or proposed species or habitat designated "critical" or "essential"?*** A Bald Eagle nest site occurs within the project area. If the nest is determined to be active, project design would include limiting implementation activities from January 1 until August 31 annually within a spatial buffer of ¼ mile non-line of sight and ½ mile for line of sight. Additionally, vegetative treatments adjacent to the nest site will be designed to provide a visual buffer for the nest site and reduce ladder fuels immediately adjacent to the nest tree to reduce the chance of loss from wildfire. These project design features would prevent any potentially significant effects to the eagle nest. As a result of these project design features being part of the proposed action this issue will not be discussed further in this analysis. No other special status species occur within the project area. Because these species and their habitats do not occur in the project area the proposed action alternatives have no potential to affect these species, so they will not be discussed further in this analysis.

***What would be the effect of the proposed treatments on carbon storage or greenhouse gas (GHG) emissions?*** An analysis of the potential effects from vegetation treatments on GHG emissions was done recently by the BLM during preparation of the John Day Basin Environmental Impact Statement. That analysis made the assumption that a majority of GHG emissions produced by a project of this type is from prescribed burning and diesel fuel exhaust from timber harvest and other mechanical treatments. An assumption was also made that alteration of vegetation would not have a long-term net effect on carbon storage because wood products harvested and removed would continue to store carbon off-site and GHG emissions from carbon from other vegetation cut or burned would be replaced and stored by accelerated growth of remaining vegetation and ingrowth of replacement vegetation. This analysis, scaled to the maximum 725 acres of treatment in the Proposed Action, would produce 3,823 tons of GHG emissions per year (assuming a 4 year implementation period). This amount is 0.00546 percent of the total 70 million tons of carbon dioxide equivalent emissions for the entire state of Oregon each year.

Because the project GHG emissions are very small and less than the 25,000 ton per year limit set by the EPA for reporting under the Clean Air Act, this effect will not be discussed further in this analysis.

***What effect would the alternatives have on the introduction and expansion of noxious weeds in areas of ground disturbance through the transport on equipment, vehicles, and materials?*** The alternatives would not have an effect on the introduction and expansion of noxious weeds from vehicles and other material because all equipment (graders, towers, cats, dump trucks, trucks) used as part of the timber sale operation would be cleaned prior to coming to the project area, gravel would be used from a weed free source, and the project area would be monitored for noxious weeds for three years following any timber harvest or fuels treatments. As a result of these project design features being part of the proposed action this issue will not be discussed further in this analysis.

***What would be the effects of the alternatives on areas within the project boundary that possess wilderness character?*** There are no wilderness characteristics on public lands within the project area. These public lands were not identified in the 1978-9 BLM Wilderness Inventory as having wilderness characteristics, due to their small size and lack of outstanding solitude or primitive, unconfined recreation opportunities. No new information exists that would change the 1979 inventory findings. None of these public lands are road-less, with a contiguous acreage over 5,000 acres. Because there are no wilderness characteristics, this issue will not be discussed further in this analysis.

## Appendix C - Project Design Features

### Vegetation Treatments

- Contractors would be required to remove hazard trees as designated by the BLM or TID. In the context of this project, a “hazard tree” is an unstable or defective tree of any size, live or dead, that is threatening life or property. Hazard trees would normally be located close to homes or other structures, developed recreation sites, heavily used recreation trails, and primary roads within or adjacent to the project area. At-risk areas within the project area would include homes/structures on private property within 150 feet of the boundary, Tumalo Reservoir Road, Sisemore Road, Graves Driveway, the non-motorized parking area (if constructed), and Tumalo Irrigation District facilities, including the Tumalo Feed Canal, ditches, primary access roads and the bridge at the silt pond. Some characteristics that could cause a tree to be classified as a hazard would include: dead, dead top, disease (heart or root rot), multiple tops, large malformed or weak branches, and leaning (10% or more from vertical). In addition:
- No ponderosa pine trees equal to, or greater than 21 inches DBH would be cut, except those deemed to be hazard trees.
- Ground-based yarding would require at least one-end suspension.
- Specific isolated areas with an excessive amount of surface rock such that vehicle or tire damage could occur may be waived for tree removal. The contractor shall request a waiver and obtain approval in advance.
- Contractors will be required to close/disguise all newly created access spur roads. Closures shall be done with one or more of the following techniques: placement of local rock and woody debris, importing woody debris (slash) and rocks, recontouring to eliminated ruts and berms, seeding with native species.
- Operations during severe weather events such as unusually heavy or prolonged periods of precipitation and rapid spring snow melt will be evaluated by the BLM for potential soil or road impacts and may result in temporary suspension of ground-based equipment operations.
- No mechanized equipment on slopes greater than 35%.
- No mechanized equipment in lava ridge and other rocky areas. Hand treatment only by chainsaw felling of small juniper and thinning of small ponderosa pine.
- Skid trails or two-track access trails would be no closer than 100 feet apart. In-woods equipment allowed would include: feller-buncher, conventional skidder, forwarder, small tractor, skid-steer, pick-up, flatbed truck, or a combination of equipment depending on contractor capabilities and harvest techniques. In-woods equipment use (use between skid trails) would be limited to 3 passes or less over any given area.
- Use existing roads and old skid trails whenever possible.
- Landings would be located at old landing sites and existing openings whenever possible.
- Ground-based equipment would not operate in, or cross riparian areas

### Ponderosa Pine Leave Tree Criteria

Thinning within ponderosa pine stands would focus on leaving the healthiest trees rather than a strict geometric spacing. Leave trees shall have the following characteristics:

- Healthy, dark green foliage with 50% or greater live crown ratio (LCR) in trees up to 4 inches DBH, and 25% or greater LCR in trees greater than 4 inches DBH.
- Good form and taper.
- No significant crook, sweep, multiple tops or ramiform branches (malformed or weak limbs coming off the main trunk). In trees less than 4 inches DBH, that otherwise meet all other leave tree criteria; one ramiform branch is allowed but must be trimmed flush with main bole with chainsaw.
- No visible dwarf mistletoe infections or stem disease cankers. In heavily infected stands, no infections or cankers on the main stem, but one infected lateral branch is acceptable.
- No broken tops (leaders) or mechanical damage wounds exceeding 1/3 of the circumference of the main bole.
- Lean of less than 15 degrees from vertical.

### **Old-Growth Juniper definition**

Old growth trees generally have two or more of the following characteristics:

- Large diameter trunk (may be smaller than 18 inches)
- Large horizontal lower limbs
- A broad irregularly shaped crown, often rounded or flat topped
- Main trunk and/or limbs twisted
- Dead, weathered branches and/or spike top(s)
- Main trunk and lower branches partially dead with strips of live cambium spiraling toward the live portions of the crown
- Heart decay and/or hollowed-out trunk, often with small mammal or bird nests
- Deeply furrowed, fibrous reddish bark
- Abundant fruticose lichen growth (bright yellow or green), especially on the dead portions of the trunk and limbs

### **Webber Springs and Canal Seepage**

Within these riparian type areas:

- Cut selected understory and midstory ponderosa pine and juniper by hand, delimb and leave boles in place. Lop/scatter or pile slash.
- Cut and remove competing conifers from edges to expand riparian zone, and possibly increase flow from Webber Springs.
- Follow-up pile and burn, and jackpot burn in operationally feasible areas to treat slash concentrations and regenerate grasses, sedges, willow, alder, birch and dogwood.
- Hand piles would not be placed in wet areas.

### **Weeds**

- Contractors will be required to check mechanized equipment for noxious weeds and certify that equipment is free of noxious weed seed or any noxious weed plant parts prior to entering the project area. Any required cleaning of equipment would occur off-site.
- The project area would be monitored for noxious weeds for three years following any timber harvest or fuels treatments. Any noxious weed populations detected would be targeted for prompt treatment and monitored for follow-up treatments until the population is eliminated.

### **Prescribed Fire for Activity Fuels Reduction**

- Landing Piles – Slash at the landings will be disposed of either by grinding/removal, on-site mechanical reduction, or machine piling and burning.
- Hand and Machine Piles – Place piles at least 20 feet beyond the drip line of leave trees where feasible. Do not place slash piles in riparian areas. Piles will be at least 25 feet from private property boundaries and 25 feet from facilities such as roads, power lines and canals. Hand piles would range in size from 4 to 7 feet in diameter.
- Old Existing Piles - Eliminate old slash piles by moving or adding additional fine fuels for a cleaner burn. Any existing old piles near leave trees would be moved to a safer location for burning or left unburned.
- Jackpot and Swamper Burning - Pull slash back from leave trees, particularly old-growth ponderosa pine and old-growth juniper. Add slash to existing old slash piles for a clean burn. Some interior areas with light fuel loading may not need burning.
- All prescribed pile burning would occur in the winter months (October 15 to March 15), would be weather dependent, and would be guided by an approved Burn Plan to ensure public safety. Smoke management guidelines would provide for optimal smoke dispersal away from adjacent residential areas and other smoke receptor sites such as Bend, Redmond and Sisters.

### **Recreation Access and Trails**

- Some spur roads may be needed for new or rerouted equestrian/hiking trail locations. Retained spur roads would be left open and narrowed with woody debris, rocks and natural vegetation ingrowth. These routes would be determined by BLM.
- Construct or reconstruct of new segments of fence in strategic locations to close gaps, tie in with gates, or otherwise facilitate control of public access and unauthorized OHV travel.

### **Wildlife**

- Leave all trees with sticks nests or cavities
- Leave 6 hard snags/acre comprised of the largest available snags
- Leave all soft snags
- Leave 120 lineal feet/acre of largest available down logs in decomposition class 1 and 2
- Leave stable green wolf trees
- Retain trees from treatment, where needed, to provide visual screening between trails and the bald eagle nest. These trees will be marked by BLM wildlife staff.
- Treatment will not occur within ¼ mile of active raptor nests during the breeding season. Locations and timing of seasonal restrictions will be identified following wildlife surveys and will be dependent on the species needs.
- Treatment will not occur within the proposed bald eagle closure area from January 1 to Aug 31st, unless BLM wildlife staff determines the nest is not active or the young have fledged and are no longer dependent on the nest.

### **Cultural Resources**

- All treatments would be designed to avoid disturbance to historic properties and paleontological resources. Project design would avoid treatment to sensitive areas or modify treatments to avoid impacts. Any slash concentrations created by hand chainsaw treatment will be hand removed and/or piled or scattered outside the site protection area. Compliance with the National Historic Preservation Act and Section 106 would be completed prior to implementation. Any new discoveries of cultural resources during implementation would temporarily stop project activities and the district cultural specialist would be contacted. The project would resume upon completion of an assessment by the district cultural specialist and, if necessary, further project design features are identified.

### **Water Quality and Canals**

- A majority of mechanized harvest and removal operations on portions of the project area would occur during the non-irrigation season (October through April 15). Operations during this period would allow equipment to cross ditches and canals and avoid interference with the Tumalo Irrigation District operations and maintenance activities during the active irrigation season.
- Mechanized equipment would be allowed to cross ditches and canals only at BLM and Tumalo Irrigation District designated crossings. Crossings would be rehabilitated/re-contoured following completion of ground operations and before the beginning of irrigation season.
- The proposal is for 3 crossings on the relic Columbia Southern Canal and possibly one crossing on the Tumalo Feed Canal during non-irrigation season. Crossings would use existing shallow road or trail dip crossings and would not require placement of additional fill material. Feeder ditch crossings would be at a few limited designated crossings (during non-flow). The feeder ditch crossings would be filled in and leveled for operations. These crossings would be repaired after operations by digging out the ditch and re-contouring to match the adjacent ditch depth and bank height grade excavation.
- Webber Springs Pipeline – Either avoid (no crossings) or designate one or two crossings. Import native material to pad pipeline for 12 foot wide crossing, then re-contour when done. May leave pipeline crossings covered at the request of Rock Springs Guest Ranch.

### **Soils**

- No more than 15 percent of the project area, excluding permanent roads, shall become compacted or exhibit other forms of detrimental soil disturbance during an initial stand entry. Detrimental soil disturbance includes compaction, displacement, puddling, and charred soil in intensely burned areas (Howes 2006) due to pile burning.
- When reentering previously disturbed stands, existing disturbed areas (including skid trails, landings, and burn locations) should be reused where possible.
- If the total area exhibiting detrimental soil disturbance as a result of initial and subsequent entries is greater than 15 percent of the project area, rehabilitation measures would be taken to reduce disturbance to no more than 15 percent of the project area. Rehabilitation would include sub-soiling compacted areas, re-contouring, and seeding with native vegetation.

### **Grazing**

- Remove non-functional interior fences where they would interfere with mechanized operations or present a hazard to wildlife or non-motorized recreation and are not needed for livestock grazing management.
- Areas would be rested from livestock grazing for up to two years following a vegetation treatment or pile-burning treatment if grazing would interfere with re-establishment of understory vegetation.
- Functional and legal fences and other facilities would be protected during operations. Any damage to fences or facilities would be promptly repaired.
- Existing fences that deviate from the Federal cadastral survey of property lines may require removal or relocation, either to facilitate project implementation or for future land management activities. All new property line fence construction would coincide with the recent Federal cadastral survey.
- Fence construction would follow the following design specifications: 4 strand (bottom and top smooth wire; middle two wires barbed) spacing is 16", 22", 28", 40". Permittee would construct and maintain allotment fences. All new construction would be surveyed for wildlife, botany, and cultural resources prior to construction.

### **Air Quality**

- Prescribed fire activities would be conducted in compliance with the National Ambient Air quality Standards and Oregon Department of Oregon Environmental Quality regulation and restrictions and Oregon Department of Forestry State Smoke Implementation Plan to track smoke produced and monitor particulate matter and carbon monoxide emissions from existing smoke receptor sites.
- Prescribed fire would only be conducted when prevailing and predicted wind patterns and atmospheric conditions would result in negligible effects to the Bend Designated Area and the Three Sisters Wilderness Class 1 Airshed.
- A prescribed burn plan would be established prior to any burning in the project area, which would describe the conditions, or weather parameters (wind directions/speed, relative humidity, air temperature and fuel moisture) that would have to be met prior to ignition.
- During dry and dusty periods and when in close proximity to private residences, while thinning operations are active, dust abatement would be performed periodically as necessary by applying water to road surfaces in areas of high activity.

### **Visual Resources**

- Where feasible, locate burn piles beyond immediate foreground viewing distance of Tumalo Reservoir Road or in locations where they are partially screened from view by topography or tree crowns.
- Use slash to break up linear disturbances made by harvest equipment and to break up existing linear features such as roads/trail that are slated for decommissioning.

### **Safety**

- A Spill Contamination Kit would be kept on-site during any operation within the project area; prior to starting work each day, all machinery would be checked for leaks and necessary repairs would be made.

Removal, notification, transport and disposal of any diesel, hydraulic fluid, or other petroleum product spilled into soil and/or water would be accomplished in accordance with U.S. EPA and DEQ Laws, and regulations.

- Use of the TID bridge near the silt pond would be in accordance with the bridge design capacity and condition. The BLM Engineer would do a bridge inspection, assessment, and use recommendation before haul operations begin.

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