U.S. Department of the Interior
Bureau of Land Management

Prineville District Office
3050 N.E. 3rd Street
Prineville, Oregon 97754

October 2003

Draft
Upper Deschutes Resource Management Plan and Environmental Impact Statement

Volume 2 - Chapters 1,2,3,4,5

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

BLM/OR/WA/PL-03/047+1792

Chapter 1: Purpose and Need

Purpose and Need

The purpose of the Upper Deschutes Resource Management Plan (UDRMP) is to guide the use, protection, and enhancement of resources on public land in the planning area. This resource management plan will replace the 1989 Brothers/La Pine Resource Management Plan (B/LP RMP) for the western half of the plan's area. This plan would also revise a portion of the Two Rivers Management Plan (TRRMP) by changing the boundaries of the planning areas in order to address issues common to the adjacent UDRMP Planning Area.

Following The Interior Columbia Basin Strategy (BLM, 2003), the goals of the revision will be to:

- Sustain and, where necessary, practical, and within available funding, restore the health of forests, rangeland, aquatic, and riparian ecosystems.
- Provide a predictable, sustained flow of economic benefits within the capabilities of the ecosystems.
- Contribute to the recovery and de-listing of threatened and endangered species and 303(d) listed waters.
- Provide diverse recreational and educational opportunities within the capabilities of the ecosystems.
- Manage natural resources consistent with treaty and trust responsibilities to American Indian Tribes.

The combination of changed circumstances and new information has driven the need to revise the 1989 B/LP RMP. The 1989 plan did not anticipate land management issues related to the rapidly growing population in Bend, Redmond, Prineville, and nearby communities. In addition, new information about the planning area has been made available.

Changed Circumstances

Population growth, a court ruling, and new guidance for some special status species have changed the circumstances within the planning area.

The population in Central Oregon has increased and is continuing to increase more rapidly than state and national averages. The planning area contains the fastest growing county in the State of Oregon, and this growth is due to influx of new residents. The population of Deschutes County is projected to double between 1990 and 2010 with population reaching 151,230 (Portland State University Center for Population and Census). Bend, immediately adjacent to the planning area, and Redmond, within the planning area, are two of the fastest growing cities in Oregon. This dramatic population growth exceeds what the BLM expected when it prepared the 1989 B/LP RMP. The increase in local and regional population has meant an increased demand for use of public land to support community needs (including new and expanded transportation corridors, mineral materials sites, sewage treatment sites), private land development (access and utility rights-of-way and sites), and a variety of recreational activities that draw both local and out-of-area visitors to BLM lands. The increased population growth has resulted in increased demand for recreation leases and for commercial recreation activities on BLM lands.

With increased amount and diversity of use on and adjacent to public lands, there is a lack of recreation services and infrastructure, conflicts between visitors, resource impacts, and a shortage of some recreational opportunities.

Litigation involving the Millican Valley Off-Highway Vehicle (OHV) area resulted in the BLM agreeing to consider the cumulative effects of OHV use in the Millican Valley area in an EIS. The BLM has chosen the UDRMP to identify alternatives for managing OHV use throughout the area, including Millican Valley. The RMP will analyze the direct, indirect, and cumulative effects of the alternatives on all appropriate resources.

Another changed circumstance is an increase in the number of plant and animal species recognized as special status species. The State of Oregon listed two plant species found within the planning area as "Threatened" (OAR 603-073-0070): Peck's milkvetch and the pumice grapefern. Additionally, the decline of sage grouse populations has triggered a BLM state-wide strategy with new guidance to prevent listing of the species under the Endangered Species Act.

In 1997, the Oregon/Washington BLM adopted the Standards for Rangeland Health and Guidelines for Grazing Management (BLM, 1997), and incorporated the Standards into existing plans. The Standards meet the intent of 43 CRF 4180 (rangeland health regulations), which contain the objectives to "…promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions . . . and to provide for the sustainability of the western livestock industry and communities that are dependent upon healthy, productive rangelands.

New Information

New information has become available since BLM prepared the B/LP RMP. Much of the new information was generated by the Interior Columbia Basin Ecosystem Management Project (ICBEMP), a broad-scale, Basin-level analysis, in "An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins (Quigley and Arbelbide, 1997)." New information from this and other sources includes:

1. Recent Biological Opinions issued under the Endangered Species Act indicating additional guidance is needed to protect some plants and animals in portions of the planning area (Prineville District BLM records);
2. Downward trends in ecological integrity, based on the condition of soil and vegetation, and impacts from land uses including recreation, grazing, agriculture and urban or rural development (Quigley and Arbelbide, 1997);
3. An increase in fragmentation and loss of plant and animal species diversity or genetic resilience due to loss of connectivity within and between blocks of upland forest, shrub-steppe, and riparian habitats (Quigley and Arbelbide, 1997);
4. Noxious weed encroachment and the expansion of juniper and other woody species beyond their historic range of variability (Quigley and Arbelbide, 1997);
5. New requirements for plant and animal species habitat (Quigley and Arbelbide, 1997);
6. The importance of late and old seral plant species, historic disturbance factors such as fire on the landscape, and sustainable use and development on public lands (Quigley and Arbelbide, 1997); and
7. Identification of high priority areas and special emphasis watersheds for restoration activities within the Upper Deschutes basin (Quigley and Arbelbide, 1997).

Geographic and Jurisdictional Scope of Planning Area

The planning area covers 935,226 acres of public and private land in two separate blocks in Central Oregon. The BLM has jurisdiction over more than 404,000 acres, or 43% of the planning area. The northern part of the planning area is in Crook, Deschutes, and Jefferson counties, and is located between Sisters on the west, Lake Billy Chinook on the

north, Prineville Reservoir and State Highway 27 on the east, and Pine Mountain and Bend on the south. The southern part of the planning area, also called the La Pine area, encompasses La Pine in southern Deschutes and northern Klamath counties. Overall, about 435,234 acres or 46 percent of the land in the planning area falls in Deschutes County, 439,353 acres or 47 percent in Crook County, 45,745 acres or five percent in Klamath County, and 14,894 acres or two percent in Jefferson County. Table 1-1 displays landownership in the planning area by county.

The UDRMP includes about 38 percent of the total area considered in the B/LP RMP. Map 1-A shows the planning area for the UDRMP. Boundaries for the planning area are similar to those for the B/LP RMP, except for the exclusion of the eastern portion of the planning area and the lands (including Bend and the surrounding area) that no longer have land managed by the BLM. A major addition to the planning area includes land located between and next to the Crooked and Deschutes Rivers in the southern portion of Jefferson County. The nearly 15,000 acres of the planning area within Jefferson County is currently managed under the Two Rivers Resource Management Plan (TRRMP). When completed, the UDRMP will provide management direction for this area.

The boundaries of the planning area include the public lands most affected by the rapid growth in the areas of Bend, Sisters, Redmond, Prineville, and La Pine. Map 1, Planning Area and Land Ownership Status, provides a more detailed view of this. A slightly different boundary was identified during public scoping meetings on the AMS. After comments from cooperating government agencies, the planning boundary was extended to the east to include the area south of Prineville Reservoir. This includes all of the Reservoir area considered under the Prineville Reservoir Master Plan (State Parks/BOR), as well as some of the important deer winter range in that area.

The planning area contains lands owned and/or managed by private parties, counties, and the state, and public lands managed by federal agencies, including the BLM. The decisions to be made in this RMP, however, will be made only for the BLM managed lands. Other jurisdictions with authority over other lands within the planning area may choose to utilize this process to make decisions concerning the lands for which they are responsible (see Consultation and Coordination in this Chapter and a detailed description in Chapter 5).

Table 1-1. Land ownership/administration in the Upper Deschutes Planning Area by county (acres).

	Crook	Deschutes	Jefferson	Klamath	Total
Bureau of Land Management	144,987	231,986	3,694	23,619	404,286
Forest Service and Grassland	0	38	2,059	0	2,097
Other US Agencies	7,813	0	0	0	7,813
State (estimated)	1,353	11,359	0	0	12,712
County	80	10,275	Included as Private	Included as Private	10,355
Private	285,120	181,576	9,141	22,126	497,963
Total	439,353	435,234	14,894	45,745	935,226

LEGEND

- Upper Deschutes Planning Area
- BLM State Office
- BLM District Office
- BLM Resource Area Office
- County Boundary

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

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Map 1A: General Location

Issues

This planning process is driven by issues surrounding explosive population growth and the increasing demands on natural resources associated with that growth. An "issue" is a topic of controversy, dispute, or concern over resource management or land uses within the planning area boundary that cannot be resolved using management direction provided by the existing RMP. Issues must also be well-defined and within the authority and ability of the agency to address within a reasonable range of alternatives. Issues were identified using the results of the initial "scoping" conducted between 1991 and 1996 for the "Central Oregon Urban Interface Plan Amendment", comments submitted on the Analysis of the Management Situation (published in October 2001), and new information brought to the attention of the planning team.

Based on a review of these sources of information, we identified the issues for this planning process. The issues have been organized under nine issue categories: Ecosystem Health and Diversity, Land Uses, Visual Resources, Recreation, Transportation and Utility Rights-of-Way, Land Ownership, Public Health and Safety, Archaeological Resources, and Social and Economic Values. These issues are summarized below.

1. Ecosystem Health and Diversity

Vegetation

Human influences, such as fire exclusion, overgrazing, road construction, and logging practices; and natural events, such as drought and climate changes, have led to changes in the range, composition, density, and dominance of native plant species. For example, in some areas, native bunchgrasses are declining in density and extent while cheatgrass and rabbitbrush are increasing in abundance and dominance. Noxious weeds are increasing in the planning area and replacing native species in many areas. Weed infestations decrease bio-diversity and degrade public land values for almost every resource and human activity. An increase in density and extent of woody species (trees and shrubs) and non-native annual grasses is presenting a serious fire hazard in the wildland urban interface.

Fire suppression (and other management practices that contribute to fire exclusion) is perhaps the human factor most responsible for widespread changes in native ecosystems. The dominant shrub-steppe, juniper woodland, and lodgepole pine communities within the planning area have evolved over time in response to periodic fire disturbance. Many acres within the planning area have missed at least two disturbance cycles. Without the natural ecological role of fire to periodically shape and renew landscapes, plant communities and habitats; ecosystems and watersheds have become severely altered and are no longer functioning properly in many areas.

Increased private land development and ground-disturbing uses on public lands are also fragmenting and reducing the integrity of shrub-steppe and old-growth juniper landscapes in Central Oregon. These human activities are raising concerns about wildlife habitat, biological diversity, scenic values, and ultimately ecosystem sustainability and health. Loss of private natural landscapes to urban development makes the remaining natural public lands even more ecologically and aesthetically significant.

While the loss of old-growth juniper woodland is a primary concern, the spread of young juniper resulting from absence of fire across much of the shrub-steppe habitat in the planning area is also of concern. The B/LP RMP recognized the role of fire in the ecosystem and established risk classes that provided guidance for fire suppression and fuels treatments. However, the B/LP RMP did not fully consider the health of special

status species, declining key habitats, riparian areas, old-growth ecosystems, and high natural fuel levels.

Wildlife

BLM managed public lands, adjacent ranch and agricultural land, and nearby National Forests contribute important habitat that supports healthy and diverse wildlife populations. Some examples of wildlife that use these habitats include mountain lions, coyotes, mule deer, elk, pronghorn, bats, squirrels, rabbits, golden eagles, warblers, woodpeckers, waterfowl, sage grouse and chukar partridge. The bald eagle is the only species listed federally under the Endangered Species Act and the Columbia and Oregon spotted frogs are the only two candidate species that occur in the planning area. In addition, the area provides habitat for 14 Bureau Sensitive, four Bureau Assessment and 26 Bureau Tracking species. These species use a variety of habitats and some use different types of habitats seasonally for breeding, nesting, foraging, cover and other needs.

Activities and conditions affecting wildlife and their habitats in Central Oregon include conversion of habitats to agriculture and urban development, introduction of exotic plants, recreation, and high road and trail densities. Additionally, as these activities occur across the landscape they can break up the habitats into smaller fragments and decrease the suitability of the habitats and the ability for wildlife to move through their historic ranges. This is especially true for wide ranging species such as pronghorn and sage grouse.

Recreational activities such as off road motorized vehicles, mountain biking, horseback riding, rock climbing, and caving can disturb wildlife. These activities were once infrequent with associated minor effects, but the frequency of these uses has raised concerns about how well available habitat can function. A reduction in functional habitats increases the importance of remaining suitable habitat for all species and identifies a need to examine the current uses and needs in all areas.

The B/LP RMP provided only general guidance for improving and maintaining important wildlife habitats. This RMP gave only the direction to develop habitat management plans rather than clearly identifying the important habitats and providing standards and guidelines for their conservation. The B/LP RMP stated that plans for sage grouse and bald eagles would be written during the planning cycle, but this has not occurred.

The B/LP RMP did not consider the conditions needed to support habitats for the variety of species (including BLM Special Status Species) that occur in the planning area. Nor did the B/LP RMP identify the contributions the rural and urban private land uses can make toward providing new and desirable habitats. In many cases, conversion of the native plant communities to irrigated agricultural or rural residential uses provides an increase in the forage and water sources for those species more adaptable to interact with humans.

Although population management goals for species such as mule deer, pronghorn and elk were identified in the Brothers/La Pine Resource Management Plan, habitat capabilities or vegetation management goals were not integrated into those goals. The B/LP RMP did identify habitat capabilities reflected by changes in adjacent land uses, dispersal and reproductive needs. In addition, "old" terminology such as "crucial habitat" is no longer used. New information on population numbers, movement patterns and habitat needs indicate that the goals and objectives of the B/LP RMP may not be consistent with current population needs or overall habitat capabilities. For example, the B/LP RMP identifies goals and objectives for sage grouse nesting areas around leks, but does not address the location and importance of sage grouse wintering habitat.

Water Quantity and Quality

All of the major rivers, as well as other streams, within the planning area, have been listed by the Oregon Department of Environmental Quality (DEQ) as water quality limited (See Affected Environment, Chapter 3). State water quality standards not met in streams within the planning area include stream temperature, dissolved oxygen, pH, sedimentation, turbidity, and bacteria. These water quality values can be affected by changes in riparian vegetation resulting from timber harvest, livestock grazing, and other agricultural uses; changes in the shape of stream channels; construction and use of roads and trails in areas where runoff can flow into streams; and diversion of water out of stream channels. The state standards are based on the beneficial use of fisheries. Not meeting the standards may affect the health of the aquatic ecosystem. The listing of streams as "water quality limited" by the DEQ is a new procedure and was not addressed in the B/LP RMP.

The Interior Columbia Basin Ecosystem Management Project identified a link between changes in disturbance regimes to vegetation cover, and between vegetation cover and composition to upland watershed health. A rapid increase in juniper stand establishment occurred during a period of favorable climatic conditions and reduced fire frequency and intensity (Gedney, *et al.*, 1999). Juniper successfully out-competes other vegetation for available moisture, resulting in reduced understory vegetation in open areas adjacent to juniper trees. Juniper stands in densities and locations outside of the range of historic variability, as well as human activities (e.g. road and trail construction, road maintenance, lack of road maintenance, off-road vehicle use, grazing, and horseback riding), may reduce ground cover, create ruts, and compact soils. As a result, overland flow is increased and water is concentrated in vehicle ruts, causing a reduction in infiltration of water and flashier flows within intermittent and ephemeral stream channels. These higher flows cause channel scour and streambank erosion, while decreased infiltration causes shorter flow durations for intermittent streams. Reduced periods of time that water remains in the channel diminishes the potential for establishment and growth of riparian vegetation, and reduces the amount and location of source water for wildlife. Overland flow and channel erosion results in sediment transport that contributes to downstream sedimentation and increased turbidity of perennial waters. This process has the potential to affect water quality as described above. The degree to which upland activities affect water quality and quantity is determined by the spatial relationship of these factors to the stream systems. Currently, the extent of effects of upland activities on the hydrology of the area is unknown. The B/LP RMP did not consider the relationships of these conditions to hydrologic systems.

Fire and Fuels Management

As described in the vegetation section, much of the public land within the planning area has missed two or more expected disturbance cycles created by fire, resulting in changes in species composition and density that may increase fire hazards or contribute to a decline in ecosystem function. The increase in fire hazard is especially critical when these conditions occur near or adjacent to developed land.

Central Oregon is one of the fastest developing areas in the State of Oregon. New neighborhoods and individual homes are being built in lands previously undeveloped. That area where the edge of urban development meets the edge of federally managed land is termed the wildland urban interface (WUI). The development of these areas adds a source of potential fire starts and increases the risk of damage or loss resulting from unwanted wildland fire.

The development of WUI lands has also resulted in greater concerns about emergency exit/ingress to communities, and over the management of adjacent hazardous fuels.

Potential conflicts between fuels reduction and recreational use, visual resources, and habitat management may arise.

Special Management Areas

There are various designations that BLM may attach to specific areas with special values. These Special Management Areas are established under various authorities, but generally fall into a category that includes some special attention to provide appropriate management of a sensitive or unique resource. The designations that are relevant to this process include Areas of Critical Environmental Concern (ACEC), Research Natural Areas (RNA), Wilderness Study Areas (WSA), caves, and the National Wild and Scenic River System (see Glossary for definitions and authorities).

ACECs

The B/LP RMP identified ACECs; however, due to new resource information and subsequent land management actions by the BLM, these ACEC determinations may no longer meet the significance or relevance criteria for establishment of ACECs. In some cases, existing ACEC designations may no longer be appropriate, given the additional management policy applied to an ACEC area since the B/LP RMP. In other cases, new information on the expanded range of species (e.g. Peck's milkvetch) or better understanding of other resources (e.g. sage grouse, old growth juniper, and cultural features) may provide an opportunity to expand or realign the boundaries of an existing ACEC, or lead to proposals for new ACECs. The increased development in Central Oregon and increase public use of BLM managed lands has resulted in greater management concerns at many existing ACECs, and a need to re-define what uses would be authorized in these areas in order to maintain the values for which the ACECs were established.

RNAs

The B/LP RMP identified RNAs; however, in most cases, specific management policy for the RNAs was deferred to subsequent area-specific plans, most of which have not been completed. The increased development in Central Oregon and increased public use of BLM managed lands has resulted in greater management concerns at the Powell Butte and Horse Ridge RNAs, and the need to define what uses would be authorized in these areas to maintain the values for which the RNAs were established. Specific issues include trail use in the Horse Ridge RNA and the possible impacts to RNA values, and a potential increase in visitation and associated effects to the Powell Butte RNA due to a proposed adjacent resort development. The travel management guidelines for the Powell Butte RNA were superceded by a Court order (Central Oregon Forest Issues Committee v. Kenna, Civil No. 98-29-ST (D. Or.), Final Decision), which opened the area to motorized use on existing roads and trails.

Caves

The B/LP RMP did not identify any management policy for caves within the planning area. Since the adoption of the B/LP RMP, some of the caves on BLM managed lands have been identified as "Significant" under the Federal Cave Resources Protection Act. Increased population growth in the area has resulted in greater numbers of cave visitors. The popularity of these sites, and the new USFS, Deschutes National Forest cave management policy in areas adjacent to BLM lands, may affect future use and management needs at BLM managed caves, particularly in regards to rock climbing opportunities in Pictograph Cave.

Wilderness Study Areas

The Badlands WSA has been the subject of considerable attention concerning designation as Wilderness (which is outside the scope of this plan) and the ongoing management within the boundaries of the WSA. Current travel management policy has limited motorized use to designated, inventoried routes and seasonal closures as specified by a Court order (Central Oregon Forest Committee v. Kenna, Civil No. 98-29-ST (D. Or.), Final Decision). There has been a continued demand for increased motorized access to the Badlands WSA, as well as continued demand to close the area completely to motorized use. Vehicle use occurs off designated, inventoried routes in violation of the interim management policy for WSAs. This use includes OHVs, hunters, and sightseers. Non-motorized use has also become increasingly popular within the WSA. However the B/LP RMP does not provide any guidance for managing non-motorized use within the WSA, including direction for functional trailheads or parking areas.

Non-motorized trail use is also increasing in the Steelhead Falls WSA. As with the Badlands WSA, the B/LP RMP does not address the management of these uses. Due to inadequate signs and lack of designated and maintained trails, there has been an increase in access points, a proliferation in user trails, and an increase in erosion and resource impacts. These conditions have led to concerns about the safety of visitors and maintenance of wilderness suitability.

Commercial and group use demand has increased in both WSAs, and no specific policy to address these uses was included in B/LP RMP (se Visual Resource Issues for description of new issues for visual resource management in WSAs).

Wild and Scenic Rivers

Three components of Wild and Scenic River Management are at issue within the planning area. First, Visual Resource Management standards for Wild and Scenic Rivers within the planning area are either absent or not consistent with BLM policy. Consequently, there is a need to create or modify this direction. Second, some lands administered by the BLM along the Middle Deschutes Wild and Scenic River were designated open by the B/LP RMP. The Wild and Scenic River plan did not address travel management designations. The current travel management guidance within the Wild and Scenic River plan must be reviewed to ensure that it is consistent with Wild and Scenic River and UDRMP objectives. Third, a portion of the Lower Crooked River (including the Chimney Rock segment) and the Middle Deschutes have been recognized as Aquatic Strongholds (Quigley and Arblebide. 1997). These portions of the rivers were identified as at risk for hydrologic function due to the intrusion of juniper into the watershed. Juniper has been out-competing riparian vegetation such as willow and herbaceous plants. As juniper replaces riparian species, overland flow of water and increased erosion are likely to occur. New guidance is needed to reduce this risk.

2. Land Uses

For this planning effort, land uses include livestock grazing, minerals, military use, and timber (including special forest and range products).

Livestock Grazing

There has been an increase in the amount of recreational and other uses in grazing allotments and a change in land uses on private land adjacent to grazing allotments. In some places, housing subdivisions have been built in the middle of grazing allotments in open range areas, leaving the new homeowners to sort out how to build adequate fences,

and the permittee to deal with inevitable fencing failures and unleashed dogs, and the resultant stray livestock in flower beds, on golf courses, and on busy residential roads. Homeowners are often unfamiliar with and resentful of the responsibilities of living next to rural activities, and the grazing permittees and BLM cannot always afford to absorb the increased management costs that come with responding to this situation.

The B/LP RMP did not anticipate the increased conflicts, nor did it provide direction for how to estimate potential conflicts, resolve problems, or prioritize efforts. The result is that conflicts are solved on a case-by-case basis, often leaving the root cause in place, allowing conflicts to re-occur and escalate.

The B/LP RMP made decisions about forage allocation and areas available for livestock grazing based on natural resource conditions that, for the most part, are substantially unchanged.

Where physical or biological conditions have changed, BLM managers can use existing guidance[1] to make necessary changes in livestock grazing management. The objective of this guidance is to "promote healthy sustainable rangeland ecosystems, accelerate restoration and improvement of public rangelands to properly functioning conditions, and provide for the sustainability of the western livestock industry and communities that are dependent upon productive, healthy public rangelands".

The BLM developed the Standards for Rangeland Health and Guidelines for Grazing Management (BLM, 1997) to meet the requirements and intent of 43 CFR 4180, and provide agency policy and direction for livestock grazing management. The Prineville District BLM has completed these assessments on several allotments within the planning area, and is scheduled to complete all assessments by 2008. While assessments will not be completed as part of this process, the planning process will help identify important wildlife habitats, species, and areas of special concern, to help prioritize where assessments should be conducted first.

Minerals

There is an increasing demand on the public lands to provide mineral materials to meet the needs of growing communities and the economy of Central Oregon. Mineral materials are needed by state and local governments and private industry to build and maintain roads, highways, bridges and other infrastructure. However, other uses on and adjacent to public lands are also increasing, resulting in an increased potential for conflicts with mining. Residents and recreational users have voiced objections to mining-related noise, dust, truck traffic, and visual impacts to viewsheds. People are concerned about what kind of criteria will be used in the future for decisions about material site use, and how that is likely to affect them in the long term. New site development also has the potential for permanent or temporary removal of natural resources and reducing wildlife habitat suitability.

Many old mineral pits are located in the planning area that did not, in the past, require any specific rehabilitation plans. As more people inhabit the private lands near and adjacent to BLM administered lands, concerns have been raised for how existing and future mineral material sites will appear over the long term and what types of uses would be allowed within those sites.

Timber and Special Forest and Range Products

An insect epidemic and subsequent salvage harvest have changed the forest structure, habitat, and fuels profile in the La Pine portion of the B/LP RMP since the RMP was completed in 1989. As a result, some decisions and management direction in the RMP regarding forest management may no longer be valid.

[1] 43 CFR 4180

New information indicates that a new focus is needed to address updated BLM-wide objectives for forest health, fire hazard, and wildlife habitat. Current management direction and scientific findings from the Interior Columbia Basin Ecosystem Management Project indicate that goals that are focused on healthy forest and rangeland conditions, with sustainable outcomes resulting from those conditions, are important to provide more stable natural resource-based economies. The B/LP RMP does not reflect projected commercial forest product outcomes based on a comprehensive, ecosystem approach that considers biodiversity, special status plant or wildlife habitat, general habitat connectivity, the role of old growth juniper, scenic values, or strategies for continued urban interface fuels treatments and insect and disease management.

The B/LP RMP did not consider the function of historic or natural disturbance regimes and the role that they play in maintaining vital ecosystem functions, nor address the relationship of forest management to these long-term desired outcomes. The B/LP RMP also did not recognize the degree to which natural forest habitats would be limited by the population growth within the area, or the importance of these shrinking habitats to wildlife populations and public use.

Special forest and range products are not specifically addressed in the B/LP RMP. Increasing growth of local communities is increasing the demand for both personal and commercial use of these products. Increasing harvest, competing uses, impacts, and a shrinking available resource base are stretching the sustainability limits of some of these products in some areas. Updated guidance is needed to help make decisions regarding what, how much, where and when to allow harvest of these products.

Oregon Military Department and National Guard

Military training in the planning area first occurred in the late 1930s and continues to contribute to the mission Oregon Military Department (OMD) and National Guard today. The mission of the military is to remain in a state of preparedness in support of state and national security interests, and lands within the planning area are an important component to fulfilling that mission.

Increasing development adjacent to the existing training area tends to create conflicts between residents and some of the military uses of the area. Noise and dust from training disturbs adjacent landowners and thus, from the military perspective, reduces the usefulness of some of the training area they have traditionally used. The increasing use of the area for hiking, horseback riding, mountain biking, shooting and OHV use also sometimes conflicts with military use in the area. Having sufficient usable area to complete a variety of types of training in varied terrain and locations increases the effectiveness of the training facility.

The training area has been administered under a series of short term permits which limits the ability of the military to appropriate funding to rehabilitation efforts and does not allow for funding for long-term resource management. The B/LP RMP does not address this issue.

3. Visual Resources

Population growth and development within the planning area is expected to increase the variety and number of applications for permits for developments and activities that have the potential to affect visual resources. Some examples are new roads, signs or advertisements, electrical transmission lines, material sites, water tanks, or cellular phone towers. The B/LP RMP did not identify Visual Resource Management Classes within the planning area as a baseline for assessing impacts to visual resources. The B/LP RMP also does not address key viewpoints or areas of high public concern regarding scenic

quality that have changed within the past 10 years, nor does it address new policy for Visual Resource Management Classes within Wilderness Study Areas. Further, the B/LP RMP guidelines do not consider the increased emphasis on vegetation management for ecosystem health or increased emphasis on fuels treatments as part of the National Fire Plan, both of which have the potential to affect visual quality in the planning area.

4. Recreation

The increasing population and popularity of Central Oregon as a recreational "mecca" has been reflected in increased recreational use on BLM administered lands. Increased conflicts among users, new resource management concerns, and increased management costs have accompanied the increase in use.

General Recreation Management

The B/LP RMP identified most of the area as an "Extensive Recreation Management Area". This is a general classification applied to lands that have few concerns or conflicts that require a high level of management attention. An alternative classification, Special Recreation Area, may be more appropriate for a large portion of the planning area. This classification provides a vehicle for addressing resource concerns, user conflicts, and high levels of recreational use by creating identities and recreation management objectives for areas and improving funding opportunities for managing uses.

Most of the recreation access and use areas in the planning area appear uncared for with most points of access to public lands created through use, rather than by design. As a consequence, access and use areas often are neither safe, nor appropriate or desirable, which makes management of public lands difficult. Lack of information about land ownership and appropriate access has led to trespassing on private lands.

Recreational Setting and Demands

The BLM managed lands in the planning area are of varying sizes ranging from small blocks less than 40 acres to large blocks of more than 30,000 acres. The lands are situated in and around urban centers, residential and resort developments; they surround or are adjacent to State Parks; and they are frequently contiguous with large blocks of land managed by the National Forests and Grassland. The recreational needs for public lands in the area are a combination of urban-type demands such as trail links between urban areas, after work hiking, running, driving, or biking, day use and picnic areas; and demands for more dispersed extended recreational experiences like weekend outings to popular areas like Horse Ridge, the Badlands, Millican Valley OHV area, reservoirs and State Parks.

Members of the public who use these types of recreation settings have difficulty recognizing administrative boundaries, and thus effective management of these areas require a higher level of collaboration between different agencies, groups, and individuals to make the best use of limited resources and funding. Cities and counties within and adjacent to the planning area have identified BLM lands as suitable for establishing regional trails. The B/LP RMP did not identify opportunities for or provide management direction to integrate regional trail or other recreation opportunities to meet state-wide projections or local community needs.

Motorized Recreation

OHV Setting and Demand

The overall increase in OHV use on BLM-administered lands has increased crowding and conflicts between trail users. OHV users have expressed a need for more OHV opportunities, including both longer trail systems, and shorter trails or play areas located close to urban areas, and an increase in winter-time trail riding opportunities. Current and future demand for OHV opportunities anticipate the need for OHV trail systems that meet seasonal demand and allow for a range of difficulty levels that satisfy a variety of users, including single-track (Class III) and quad (Class I), as well as full size 4X4s (Class II vehicles). BLM lands provide important OHV opportunities during the winter, when other local areas are closed to OHV use. Many of these areas are also important wildlife habitats.

Most of the areas designated as either limited or open in the B/LP RMP lack adequate staging areas and dispersed camping sites, particularly for groups. Gravel pits often provide good opportunities for play or staging areas. The B/LP RMP did not provide management direction for how these areas should be managed. Some of these are appropriate for some uses, and not for others, depending on their location and the expected mineral use for the area. In general, these are unmanaged, yet are receiving increased levels of use.

Many smaller (40 to 120 acres), isolated parcels of BLM managed land in the planning area were designated as "Open" in the B/LP RMP. Subsequent development over the past 10 years has surrounded many of these parcels with private residences, resulting in increased conflicts or a general lack of public access. The change in management setting for these smaller parcels has led to concerns about the suitability of managing them for cross-country OHV use.

OHV Management

Portions of the planning area were designated as "limited" in the B/LP RMP. Many of these areas did not undergo any further planning to define and designate the road and trail system, and therefore have remained essentially open to unmanaged OHV use. This has resulted in increased conflicts between OHV enthusiasts and private landowners, as well as between different recreational users. The lack of a designated and managed OHV trail system in these areas has also resulted in the spread of user-created roads and trails, as well as a diminished user experience for OHV riders.

The combination of an increase in OHV use, additional residential development on private lands adjacent to areas of OHV use, and increases in all recreational uses have increased concerns about the noise and dust of these vehicles.

Non-Motorized Dispersed Use

Non-Motorized Recreation Setting and Demand

The growth of non-motorized trail use by equestrians, hikers, runners, mountain bikers, and others has resulted in conflicts between trail users and resource impacts. Overall a concern for public safety has developed and some users have noted that their enjoyment of these outdoor settings have diminished as a result of these problems. The increase in uses and conflicts has resulted in requests for designated non-motorized trails or areas, which were generally not identified in the B/LP RMP.

The B/LP RMP provided no management direction for trail opportunities beyond OHV use. Although OHV trails on BLM managed lands are open to all users, the lack of identifiable and maintained trails for hikers, equestrians, mountain bikers and other non-motorized recreationists has resulted in users creating their own trail opportunities. The lack of identifiable, non-motorized trail systems limits recreation opportunities for the public; particularly those who do not live adjacent to public lands (see also Special Recreation Permits).

The continued popularity of mountain biking has led to increased demand for challenging riding opportunities on BLM managed lands such as at Horse Ridge and Cline Buttes. This demand includes cross-country or single-track riding that is more primitive and backcountry in nature than most developed and maintained mountain bike trails. This demand also includes downhill courses. The location and nature of these types of activities may result in resource conflicts. Mountain bikers (as well as other trail users) in the Cline Buttes, Horse Ridge and Smith Rock areas of BLM lands often trespass on undeveloped private property. Future development of these private parcels will disrupt this recreational use, and result in creation of new trails around private property and future conflicts between private landowners and recreationists.

Non-Motorized Recreation Management

Current BLM management policy for the Millican Valley OHV trail system limits mountain bike use to the designated OHV trail system, eliminating options for single track mountain bike opportunities in this area. The current BLM management policy for Millican Valley also limits mountain bikes to the same seasonal restrictions as motorized users. In general, the demand for mountain bike opportunities on BLM land occurs specifically during the winter, and these seasonal limitations have a large impact on opportunities for mountain biking.

Increased population growth in the planning area has resulted in increased levels of use by a wide variety of recreationists, and the development of casual use sites for camping, rockhounding, target shooting, paintball, and rock climbing. These sites are unmanaged, and, in some cases, use of these sites results in resource conflicts or safety issues. The B/LP RMP provided no direction for management of many of these activities.

Temporary Use Authorizations

The District receives numerous, and often repeated requests for temporary use authorizations for activities such as photography, commercial filming, or educational purposes. There is no current procedure for streamlining these requests, nor does the B/LP RMP identify areas where these activities may be preferred or discouraged based on other resource needs.

Special Recreation Permits:

Special recreation permits are issued for commercial recreational activities, competitive events, and group events that are publicized or would likely result in resource management issues. Population growth and increased visitation/awareness of BLM managed public lands has resulted in increasing numbers of requests for Special Recreation Permits in the planning area. These permit requests include annual or multi-year permits for outfitter/guides (flyfishing, nature hikes, equestrian trail rides, etc.), for single day events (group events, concerts, trail rides and races, etc.). The B/LP RMP provides no direction on how special recreation permits should be managed on issues such as number of permits, permitted use levels, etc.

5. Transportation and Utility Rights of Way

The Bureau of Land Management authorizes right-of-way grants to federal, state, and local governmental agencies, companies, cooperatives, and private individuals to develop necessary transportation to utility systems through public lands. Because 43% of land within the planning area is administered by the BLM, these lands are laced with roads and other rights of way that are important to local communities, the region, and, in the case of natural gas pipelines and electric power transmission lines, the nation.

A right-of-way corridor is an alignment that has been identified as a preferred location to accommodate similar or compatible rights-of-way. Public land law directs BLM to minimize adverse environmental impacts by avoiding the proliferation of separate rights-of-way and utilizing rights-of-way in common, to the extent practical (Section 503 (43 U.S.C. 1763) Federal Land Policy and Management Act).

Regional Transportation Systems

There are several major regional transportation corridors that traverse the planning area. These highways include U. S. Highway 97, the main north/south route through Central Oregon and U. S. Highway 20, the main east/west route through the state. State Route 126 connects Sisters, Redmond, and Prineville, and is being considered for expressway status. ODOT is planning to install passing lanes on segments between Redmond and Prineville that may affect adjacent public lands. A two mile segment of the highway located east of Redmond will eventually have to be relocated through public lands when it is improved. The existing location extends through a runway protection zone that has been designated by the Redmond Municipal Airport. Significant portions of each of these roads and others are located within rights of ways across BLM lands.

These highways are important components of economic development in the region and are intermingled with public lands. The existing highway alignments extend through urban centers, creating increased traffic and congestion problems. Improvements and relocation are likely to place specific demands on the surrounding public lands. The B/LP RMP did not anticipate these demands. For example, development in the south Redmond area has extended along both sides of Highway 97 and a highway interchange has been constructed in this area at Yew Avenue. Since the interchange was constructed, several land use projects have been developed, increasing demand and congestion in the interchange area. The congestion may eventually cause motor vehicles to back up over the at-grade railroad crossing on Airport Way, and up the exit ramps of Hwy 97, causing the interchange to fail.

The Oregon Department of Transportation in conjunction with the South Redmond Collaborative Planning Team is evaluating several proposals for highway improvements in the south Redmond area. In January 2003, ODOT completed the "Yew Avenue to Deschutes Market Road Analysis for the City of Redmond" (2003).

Solutions to this capacity issue involve considering public lands to accommodate future transportation corridors that would adequately alleviate congestion at the intersection. At some point, it is likely that a future "by-pass" for Highway 97 around the city could involve the same area.

Local Transportation Systems

A wide variety of roads exists on public lands, ranging from primitive roads or ways to arterials such as major highways. A primitive road or way is not maintained to guarantee regular and continuous use. They carry very low volumes and are normally spur roads

that provide point access. Local roads serve a small area, receive low traffic volumes, and generally serve only a few uses. Many primitive ways or local roads in the planning area were not constructed and are considered user-created travel ways. Generally, user-created roads do not provide connectivity to specific destinations. Collector roads normally provide access to large blocks of public land and connect with or are extensions of public road systems. Collector roads receive moderate traffic volumes and accommodate mixed types of traffic and uses. Arterials are state highways or major county roads designed to accommodate mixed types of traffic and serve many uses. They receive high volumes of traffic and safety, comfort and travel time are primary road management considerations.

BLM managed public lands are currently accessible from a variety of roads, including state highways, county roads, local roads, and public ways. The network of BLM collector roads offers widespread access to public lands, providing administrative access for authorized uses and various casual uses, and opportunities for dispersed recreation throughout the area.

User-created roads proliferate and are often difficult to distinguish from designated system roads, or authorized rights-of-way. Signs or other means of directing people to or along designated roads is very limited, and contributes to unauthorized uses and trespass on private lands. In most areas, the numerous user-created travel ways on public lands exceed public access needs. Motorized uses adjacent to private lands have resulted in conflicts with property owners. User-created roads that access state highways or other major roads often have unsafe intersections that do not meet current standards and frequently access areas with repeated law enforcement problems.

An estimated 2,000 miles of user-created roads, or local roads that are not maintained or officially part of an integrated transportation system, are located on BLM administered lands within the planning area. Many roads, regardless of jurisdiction, are neither appropriately located nor maintained to standards that would provide an efficient and effective transportation system that meets today's community needs.

County jurisdictions have identified so called historical or Legacy roads from research gathered from historical records. These roads provided a transportation network for early settlers and continue to be recognized by the county as public roads. Historical roads are not necessarily improved or maintained by the county. A formal vacating process is necessary if the county chooses to abandon the road. It is assumed that these roads were developed on un-appropriated public land prior to 1976, under the authority of Revised Statute (RS) 2477. By this law, Congress stated, "The right of way for the construction of highways over public lands, not reserved for public uses, is hereby granted." It was not necessary at the time to obtain further review by the federal government.

Rights-of-Way

Utility and access to private inholding rights-of-way occur throughout the planning area and range from major utility corridors to grants for primary or emergency access for subdivisions and resorts. During the period the B/LP RMP has been in effect, an average of roughly twenty five new rights of way per year have been granted in the planning area. Most rights-of-way were granted to provide access or utility service through public lands and include roads/driveways and electric/telephone service. Utility and transportation rights-of-way extending over 780 miles have been granted on BLM administered land within the planning area.

Right-of-way Regional Utility Corridors

At present, there are approximately 200 miles of regional corridors identified by the Western Utility Group that extend through public lands in the planning area and include routes for electric transmission lines and natural gas pipelines. Future development of these corridors would be subject to environmental review based on a specific proposal. There is an anticipated demand for new or expanded corridors to accommodate growth and changing energy demands for the nation.

Rights-of-way for Communication Sites

There are three existing communication sites located in the planning area (see Chapter 3, Transportation and Utility Corridors). Uses at these sites include government agencies that provide emergency services and two way radio communications, commercial telecommunication providers, and multiple user facilities that are independently managed by right-of-way holders. These sites are exclusively for low power use; high power broadcasting is strictly prohibited. There is adequate space available at these sites to accommodate additional users during the next ten to fifteen year period, as well as land area for additional new construction, if necessary.

As the population of the region grows, it is anticipated the demand for low elevation sites, especially cell phone towers, is expected to increase significantly along transportation corridors to provide improved coverage for cell phone users; and the demand for high elevation sites is also expected to increase slightly. Antennas for cellular phones can co-locate on existing utility structures and are capable of sharing structures with multiple providers.

6. Land Ownership

Retention and Disposal

Public lands are increasingly important for open space, wildlife habitat, recreation, and to separate urban sprawl as private lands within the area are developed. Public comments have repeatedly stressed a desire to see large blocks of public lands within the planning area be maintained in public ownership and with public access. Categorizing lands as to be retained rather than as available for exchange limits the ability of land managers to acquire other desirable parcels, including private inholdings within large blocks of land.

Development is beginning to surround small, isolated blocks of public lands. This affects the ability of these lands to provide wildlife habitat or other public benefits. In some cases, private land ownership blocks public access to public lands, limiting public use to all but adjacent property owners. These lands generally do not provide great public benefits, but may also be difficult to sell or trade because of their limited access.

Public lands are increasingly desirable as a source of land for urban growth and infrastructure to support growth. In particular, both the City of Redmond and the rural service center of La Pine have significant blocks of BLM-administered lands adjacent to their core developments that are needed for future infrastructure development.

Land ownership status can affect management of natural resources such as minerals or ground and surface water, as well as less tangible resources like scenery, open space, wildlife habitat, archaeological resources, and areas of tribal interest.

Acquisition

Private lands that provide important natural values are becomingly increasingly scarce in the planning area. Private inholdings within Deschutes County will most likely be developed in the next 10-15 years, requiring additional rights-of-way grants, which can also affect the wildlife habitat effectiveness of the adjacent public lands. Acquisition of private inholdings would limit both the additional fragmentation of wildlife habitat and recreation use areas with new roads and conflicts between public land users and private landowners.

7. Public Health and Safety

Increasing population in the Central Oregon area has resulted in a growing number of situations with the potential to affect public health and safety.

Firearm use has generated public safety and noise complaints for many lands administered by the BLM, especially those located adjacent to residential areas. This use includes both target shooting and hunting. The greatest concern is the risk of human injury or death. These issues are expected to increase with increased public visitation of public lands. Other issues include resource damage, private property damage, noise, associated trash, shell casings, targets and shooting tables left behind by firearm users. Opportunities for managed target shooting are available, but extremely limited, particularly given the population growth and potential growth in demand for these opportunities.

Dumping residential, commercial, and hazardous waste on public land is illegal and can damage scenic quality and pose a serious health or safety risk if the materials are toxic. These activities generally occur where there is motorized access, and appear to be related to the distance from residences and population centers.

Campfires within the planning area also pose a risk to public health and safety. Unsafe location of fires, temporary lack of attention to campfires, and the failure to completely extinguish fires provides the opportunity for accidental ignition of wildfire. Such fires pose risks to recreationists, nearby private lands and developments as well as native vegetation (see Ecosystem Health and Diversity, Ch. 1).

The increased development surrounding BLM managed lands has resulted in more concerns about camping, illegal occupancy on BLM lands, and nighttime use that is unmanaged and results in resource damage and user conflicts (i.e., large parties, bonfires, dumping, etc.).

8. Archaeological Resources

The B/LP RMP established goals for the management of archaeological resources following the regulatory direction found in the National Historic Preservation Act, 36 CFR 800, and Executive Order 11593. As a consequence of increased use of BLM administered lands, inadvertent or intentional damage to archaeological resources often occurs as a result of artifact collecting, vandalism, surface disturbance, and other destructive activities.

An Office of Inspector General (OIG) audit, completed in 2000, identified several critical weaknesses in BLM-wide cultural resource management programs. The OIG found the BLM lacks a long-range plan to survey areas for the purpose of understanding human behavior and use of the land. The OIG also found BLM deficient in other proactive efforts including stabilizing sites, interpreting sites, and preparing National Register

nominations. The B/LP RMP does not suitably address the findings of that audit. Similarly, Executive Order: Preserve America (2003) provides additional management direction for preserving America's heritage, building preservation partnerships, improving federal stewardship of Historic properties, and promoting preservation through heritage tourism. The B/LP RMP does not adequately reflect the intent of that Executive Order. Both the OIG audit and recent Executive Order are attempts to bolster proactive policies toward managing the archaeological resource base in general and "at-risk" significant archaeological resources in particular. "At-risk" significant archaeological resources may be defined as those heritage resources that are listed with or likely to be included with the National Register of Historic Places and are currently threatened by a variety of human activities and/or natural causes.

Although much of the decision about managing the cultural resource program found in the B/LP RMP remains sound, some changes need to be made. Management objectives do not meet the expectations of Section 110 of the National Historic Preservation Act to manage archaeological resources in an affirmative manner. Historic properties have not been evaluated for their eligibility to the National Register, nor has any effort been made to identify how those properties might be utilized in the best interest of the public. Similarly, the B/LP RMP does not meet the expectations of Section 14 of the Archaeological Resources Protection Act. That section directs the Secretary of Interior to prepare a schedule for surveying public lands that are likely to contain the most scientifically valuable archaeological resources.

9. Social and Economic Values

As reflected in the issues described above, there is a tremendous demand for the management of public lands to be responsive to the social and economic values of the local, regional, and national populace. Demands and desires for lands, uses, and commodities associated with local social and economic values may be in conflict with regional values, such as is represented by the issue over mineral demands. National values for maintaining public lands for wildlife habitat or recreational or other commodity production may conflict with local economic values for lands to be made available to respond to local needs. In many cases, not all values or interests in those lands can be met. The B/LP Resource Management Plan did not effectively display these trade-offs in land use or land ownership decisions.

Issues Considered but Not Further Analyzed

Special Management Areas

Scoping identified a desire by some that the Badlands, currently a WSA, be designated a Wilderness Area. Designation of Wilderness Areas is the responsibility of Congress. Consequently, this issue is beyond the scope of this plan.

Transportation and Utilities

When the Analysis of the Management Situation was published, one issue of concern was the need for a route suitable for commercial traffic that linked Prineville to Highway 20 and markets to the east. Recent legislation has provided for a transfer of the West Butte Road, (BLM Road 6520) to the respective county jurisdictions. When the right of way is developed it will extend a paved Crook County road (Millican Road) south from the "Four Corners" area to Highway 20, a distance of approximately 14.7 miles. Segments of the road extend through Crook and Deschutes County. This transfer of jurisdiction and the subsequent development will provide a truck route between Prineville and Highway 20. As a result of the legislation, this issue has been resolved.

Areas of Traditional Cultural Significance

Early in the scoping process, an issue was raised concerning whether access to areas of traditional cultural significance or resources would be affected by alternatives considered in this EIS. However, the land use plan decisions made in this document would not preclude any existing direction regarding consultation with tribes prior to implementing activities such as land transfers, or road and trail system designation. Therefore, this issue was not considered in detail further into this analysis.

Planning Criteria/Legislative Constraints

The alternatives developed to resolve the issues described above must meet legal mandates, such as the Endangered Species Act; satisfy numerous regulatory responsibilities; support national policy, including BLM Strategic Plan goals; and follow State Director guidance (see 43 CFR 1610.0-4 (b)). A detailed list of sources of guidance is provided in Appendix B.

Planning Process

Relationship to BLM Policies, Plans, and Programs

Scoping and Public Involvement

The planning process has followed the direction of The Federal Land Policy and Management Act (FLPMA), as amended, 43U.S.C. 1701 *et seq.* and the more detailed BLM Land Use Planning Handbook (Handbook 1601-1). The emphasis of the process has been to provide an open, inclusive forum for the discovery and discussion of the important issues within the planning area. Scoping for this plan revision covered a period of 10 years and culminated in the Publication of the Analysis of the Management Situation (AMS) in October 2001. The AMS, coupled with subsequent public meetings, served as another scoping period as over 100 new comments were received by the BLM in response to these events. Over this period, new information that is relevant to the planning process was generated both locally and throughout the northwest.

Coordination and Consistency with other Plans

Brothers/La Pine Resource Management Plan

Not all of the B/LP RMP is being revised by the UDRMP. The scope of the decisions included in the UDRMP is identified in the Purpose and Need and the description of the planning issues. For clarity, a more specific summary of the B/LP RMP guidance that is not being revised by the UDRMP is in Appendix C.

Wild and Scenic River Plans

The Middle Deschutes and Lower Crooked Wild and Scenic Rivers have existing management plans governing resource management within those areas. The BLM managed lands within these areas are included in the planning boundary, and the existing management plans will be incorporated by reference into the UDRMP.

Noxious Weeds

Noxious weed management within the planning area is currently in conformance with Vegetation Treatment on BLM lands in Thirteen Western States (FEIS BLM-91-022-4320 1991) and the Prineville District Integrated Weed Management EA OR-053-3-062 (1994). These plans prescribe an integrated approach involving prevention, early detection, inventory, timely control (using biological, mechanical, manual, and chemical techniques), monitoring, and site rehabilitation. The selection of control methods is influenced by land management objectives, effectiveness of the control technique on the target species, size of the infestation, environmental concerns, land uses, and economics. BLM cooperates with county, state, and other federal agencies that have jurisdiction in or near the planning area.

Two Rivers Resource Management Plan

About 15,000 acres in the far northern portion of the current planning area fall within the boundary of the Two Rivers Resource Management Plan (BLM, 1986). This planning effort would change the boundary of the Two Rivers Management plan.

Collaboration

The final formulation of the issues and alternatives was subject to the advice of a group of private citizens and tribal and governmental representatives that was chartered under the Federal Advisory Committee Act through the Deschutes Provincial Advisory Committee. This group, called the "Issue Team", consisted of tribal, local, state, and federal representatives as well as private stakeholders, including representatives of a diverse range of interest groups.

Chapter 5 details the membership of the Issue Team, as well as describing how our collaboration with tribal, local, state and federal representatives implements the direction of the legal mandates for collaboration and consultation as described under Planning Criteria/Legislative Constraints.

Related Plans

The BLM manages lands near or contiguous with lands managed by the Deschutes National Forest, Crooked River National Grassland, Ochoco National Forest, Smith Rock State Park, Prineville Reservoir State Park, and Bureau of Reclamation lands adjacent to Prineville Reservoir. Through the collaborative process described above and in Chapter 5, the planning process fully considered alternatives that would promote achievement of the goals of management on lands adjacent to BLM lands. Alternatives for managing BLM lands near Prineville Reservoir are a response to a proposed State Park and Recreation Department and Bureau of Reclamation Management Plan for Prineville Reservoir. Similarly, the DEIS considers alternatives specifically responsive to Deschutes and Crook Counties and the City of Redmond planning documents. The environmental consequences analysis considers both the potential impacts of the alternatives on lands under the authority of these governments and cumulative impacts of management of lands not managed by the BLM on BLM managed lands.

Finally, the ongoing collaboration and consultation with tribal representatives will ensure that the range of alternatives is responsive to tribal concerns.

The Oregon Military Department has recently completed an Integrated Cultural Resources Management Plan that will help to guide their activities within the permit area. The OMD would modify its plan if the area available for training changes or if the conditions of use are modified.

Policy

The key policy and decision element not described above is the Central Oregon Forest Committee v. Kenna, Civil No. 98-29-ST (D. Or.), Final Decision. As a part of the lawsuit settlement the court required that "The Bureau of Land Management (BLM) shall analyze the impacts of its Millican Valley Off-Highway Vehicle Management Plan (OHV Plan) or the successor to said Plan in an Environmental Impact Statement (EIS). This EIS shall consider the cumulative impacts of OHV use consistent with this Court's opinion, as encompassed by the Findings and Recommendations of November 5, 1998, as modified by the Order of February 26, 1999."

The UDRMP and EIS will meet the requirements of the Final Decision by:

- Developing alternatives that describe areas where OHV use is allowed within the planning area, including conditions of use within those areas that, when followed, would have generally predictable effects on resources.
- Analyzing the cumulative effects of implementing the alternatives for motorized uses, including uses in the Millican Valley, on BLM managed lands in the planning area when combined with management of motorized uses on adjacent National Forest, BLM, and private lands.

The Interior Columbia Basin Ecosystem Management Project (ICBEMP) science integration team identified a number of findings from the scientific assessment (USDA-FS and USDI-BLM 1996) that are relevant to the development of alternatives for the UDRMP. Where relevant, this information is cited in the rationale for guidance that is common to Alternatives 2-7 in Chapter 2.

Vision

This section represents a vision of how public lands would be managed in the future based on work done with the issue teams.

Ecosystem Health and Diversity

Vegetation

The planning area contains large, contiguous old-growth juniper woodlands intermixed with large and small open areas of savannah and shrub-steppe communities. Shrub-steppe communities have a vigorous and diverse composition of native shrubs, grasses, and forbs spatially arranged in a mosaic of seral stages in large and small patch sizes appropriate to conditions of climate, landform and soils. Ponderosa and lodgepole pine forests are present in a diverse mix of seral stage, structure, stand size, and species composition. Ponderosa pine is dominant on suitable sites. The proportion of old forests and woodlands is maintained at current levels with options for expansion in the future. Special status plant species are maintained or increased in their distribution and abundance. Noxious weeds and other invasive or non-native species are decreased in their distribution and abundance. Forest, woodland, savannah, treeless shrub-steppe, meadow, and riparian communities are healthy and properly functioning ecosystems sufficient to support quality wildlife habitat, hydrologic processes, and social and economic needs.

Wildlife

Ecosystem processes are functioning properly. Maintaining and restoring healthy ecosystems benefits a variety of wildlife species by increasing the quality, quantity, and

variety of habitat. Habitats support healthy, productive and diverse populations and communities of native plants and animals, including special status species and species of local importance, appropriate to soil, climate and landform. Habitats occur in large contiguous blocks, are adequately arranged spatially, and contain a natural diversity of animal and plant communities. Animal and plant populations occur and move freely across the landscape. The amount and diversity of wildlife habitats are maintained or improved through time. Native plant communities exist in blocks of various sizes distributed in patterns across the landscape appropriate to site potential. Maintenance and restoration of healthy ecosystems throughout key areas and management of specific habitat components such as vegetation cover, forage, and roads, contribute to maintaining habitat conditions within the site potential of the area.

Hydrology

Upland soils exhibit infiltration and permeability rates, moisture storage and stability that are appropriate to soil, climate and landform. Surface water and groundwater quality, influenced by agency actions, meets state water quality standards. Riparian areas are maintained, restored or improved to achieve a healthy and productive ecological condition for maximum long-term multiple use benefits and values.

Riparian

Riparian areas, floodplains, and wetlands function naturally relating to water storage, groundwater recharge, water quality, and fish and wildlife habitat.

Vegetation structure and diversity controls erosion, stabilizes streambanks, heals incised channels, provides regulation of air and water temperature, filters sediment, aids in floodplain development, dissipates energy, delays floodwater, and recharges groundwater.

Water Quality

Water quality is maintained equal to or above legal water quality standards, consistent with beneficial uses of water. Water quality provides stable and productive riparian and aquatic ecosystems.

Watershed/Hydrologic Function

Stream networks, uplands, floodplains, and riparian areas have resilient vegetation where the capture, storage and release of water limits the effects of sedimentation and erosion, and where infiltration, percolation, and nutrient cycling provide for improved water quality, water quantity, timing and duration of flows, and diverse and productive aquatic habitats.

Fire/Fuels Management

Fuels in the planning area are managed to provide for protection of communities at risk from the undesired effects of wildland fire, while assisting in the attainment of other management goals. Safety of the public and fire fighters is the first priority in planning fuels management activities, while recognizing the role of wildland fire as an essential ecological process and natural change event.

Air Quality

Air quality is generally good. Public health is protected by holding the amount of smoke

entering populated areas to a minimum. The National Ambient Air Quality Standards (NAAQS) are being met, with no significant deterioration of air quality. There are no human-caused visibility impacts to Class I areas.

Special Management Areas

The resources that led to the designation of special management areas such as caves, ACECs, and Wilderness Study Areas are protected. Thresholds for the amount and type of public uses in SMAs are established. Opportunities and partnerships for public education and interpretation for these resources are fostered.

Areas of Critical Environmental Concern

The special resources for which ACECs were designated are protected. Thresholds for the amount and type of public uses are established. In addition, opportunities for public education and interpretation are fostered, along with partnerships to help protect and interpret these resources.

Wilderness Study Areas

Wilderness Study Areas are managed to maintain wilderness suitability, consistent with the 1995 "Interim Management Policy for Lands under Wilderness Review" (IMP).

Research Natural Areas

Research Natural Areas are protected from outside human influences. Natural ecological and physical processes are allowed to occur. These representative natural ecosystems are generally reserved for education and scientific study but are also available for some types of low-impact non-motorized recreation.

Caves

Significant caves under the FCRPA remain in primarily a natural condition, and available for interpretive and passive recreational uses. Graffiti and litter are removed and the site appears natural and provides a sense of discovery.

Land Uses

Land uses occur in a pattern across the planning area, where economically feasible, socially compatible, and environmentally responsible, that support community and national demands and contribute to the local economy and quality of life.

Military

The National Guard and Oregon Military Department (OMD) continue a long-term partnership with the BLM. The partnership demonstrates land stewardship that integrates resource objectives and goals of public lands with military training objectives. Public lands supports the military training purposes of the BIAK training center where consistent with those objectives, and provide a reliable long-term land base for training operations. The military has invested time and funds to maintain and restore sustainable ecological conditions within designated training areas consistent with integrated resource management and training objectives.

Visual Resources

The scenic qualities of the planning area are maintained and improved over time. Visual Resource Management (VRM) classifications identify the scenic importance of landscape characteristics and guide the design and development of future projects.

Recreation

The planning area provides a wide variety of recreational opportunities for a growing demand. Local and out-of-area visitors enjoy frequent activities on public lands that are close to urban and residential areas, such as hiking, running, mountain biking, and off-highway vehicle use, and are attracted to Special Management Areas. Commercial recreation opportunities provide a public service while protecting resource values and minimizing conflicts with other recreationists and adjacent landowners

Local communities are integrally involved in developing and implementing management strategies for individual geographic areas within the planning area. Increases or improvements in facilities such as picnic areas, group use sites, interpretive sites or trails are developed through an integrated effort with other recreational providers and local communities. The number and types of facilities change over time to reflect demographic changes and the changing popularity of different types of recreation.

Public lands in the planning area are distinct from private lands and have a unique identity that fosters desired recreation opportunities for that area. Information on recreation opportunities, travel management, interpretation, and management goals and policies is readily available to visitors.

Areas within highly developed surroundings are managed for an emphasis on safety and compatibility with surrounding land uses. Designated access points, roads and trails are designed to minimize conflicts with neighbors as much as possible. Designated recreation trails, facilities, restored and maintained recreation sites and access points, and intensive recreation management help to meet increased demand. Public lands provide opportunities for regional trails that link communities. Local roads and trails provide a pleasing experience for users within a specific area that matches the recreation emphasis for that area.

Transportation and Utility Rights-of-way

Transportation systems, utility corridors and communication/energy sites on public lands are the result of an inter-regional coordinated effort between tribal, federal, state, and local governments that support links between communities. The corridors provide routes for approved or anticipated land uses that cannot be reasonably accommodated on other lands.

New or expanded transportation/utility system corridors and communication/energy sites are located considering the intrinsic values of public lands. Values include but are not limited to visual considerations, wildlife habitat, open space, recreation, traditional and cultural uses, and sensitive or unique resources.

Land Ownership

Public lands provide social and economic value for local, regional, and national communities. Land is maintained in public ownership that provides contiguous native ecosystems able to support healthy plant and animal populations or provides other

important natural values. Land acquisition promotes improved quality, location, or distribution of public land ownership consistent with resource management objectives. Public lands are located in a pattern that can be efficiently and effectively managed. Many public lands are available for federal and state projects, community growth, and projects for non-profit groups.

Public Health and Safety

Public lands are available for activities that do not compromise the health and safety of other land users or adjacent landowners, or diminish natural resource protection. Public lands are managed to discourage illegal activities such as dumping and vandalism. Bullets fired from BLM lands do not strike BLM land users or adjacent landowners. Firearm-related property damage and garbage related to shooting is experienced infrequently. Natural and cultural resources are not damaged by firearm discharge or illegal activities.

Archaeology

Cultural resources and "At-Risk," significant archaeological resources are managed in a pro-active manner for their various use categories as defined in BLM Manual 8100. Information about the archaeology of the planning area is current. Residents of, and visitors to, the area have an opportunity to learn about the local prehistory and history of the region. Interpretation, education, inventories, monitoring, and law enforcement enhances protection and preservation of "At-Risk", significant archaeological resources.

Chapter 2: Alternatives

This chapter describes alternative ways of resolving the planning issues and sustaining the long-term health, diversity and productivity of public lands in the planning area. The population of Central Oregon is predicted to nearly double over the next twenty years, and this growth would increase human demands on public lands, and conflicts between uses and users. The range of alternatives includes different approaches to balancing these demands and reducing conflicts.

Developing the Range of Alternatives

The range of alternatives was developed using ideas brought forth through public scoping and by the Issue, Intergovernmental, and BLM Interdisciplinary teams. The alternatives use different methods to resolve the significant issues identified during scoping in different ways. These issues were arranged into the following Issue Categories: Ecosystem Health and Diversity (including Vegetation, Wildlife, Fire/ Fuels, Hydrology, and Special Management Areas), Land Ownership, Transportation and Access, Land Uses (including Forest and Range Products, Livestock Grazing, Minerals, and Military Uses), Visual Resources, Recreation, Public Health and Safety and Archaeology. The public's interest in resource development and using these lands also played a major role in developing the alternatives. Conservation measures, or mitigations, were often developed to help resolve or minimize matters of controversy, dispute or concern specific to overlapping resource management activities or conflicting land uses.

The range of alternatives responds to a variety of human demands and, under all alternatives, provides management direction to sustain a healthy ecosystem. The alternatives are combinations of decisions about resource allocations and allowable uses that will guide site-specific decisions on public lands for the next 10-20 years.

There are some elements that are found in all alternatives. These elements are identified as "Common to All Alternatives." Elements that are Common to All Alternatives are not being revised by this DEIS and reflect the following categories of management direction:

1. Management Direction from legal statute, regulation, or manual direction. This management direction may not have specifically been reflected in Brothers-La Pine Resource Management Plan (B/LP RMP, ROD 1989). This includes management direction for things such as restricted uses near bald eagle nests or current regional decisions on noxious weed abatement techniques.
2. Management Direction from B/LP RMP, including amendments by subsequent modifications from other decisions that are not being revised by the Upper Deschutes Resource Management Plan (see also Chapter 1 and Appendix C).

This existing management direction was incorporated into the goals, objectives, and guidelines Common to All Alternatives and described in detail in Appendix A.

In addition, some of the issues identified early in this planning process were resolved using one approach in the "action alternatives" rather than re-evaluating the same approach throughout the action alternatives. These are identified under the category "Common to Alternatives 2 - 7." This management guidance represents areas where there was little controversy over the best way to resolve the issue. One example of this approach is the common management direction for the "action" alternatives for Archeological resources considered "at risk." The common approach categorizes "at risk" resources, prioritizes those resources for future actions, and limits uses that have a high likelihood of significantly impacting the integrity of those resources. Other components included in this category are summarized later in this chapter with detailed objectives and guidelines described in Appendix A.

Key Concepts

There are a number of key concepts used to develop the alternatives that are helpful to understand prior to reading the alternative descriptions. These are briefly described below.

Urban and Rural Areas

The Upper Deschutes Resource Management Plan alternatives are shaped significantly by the dynamics of the communities that inhabit this area. As described in other parts of this document, those dynamics are driven in large part by the changing rural and urban character of the population and economies. This is reflected both in terms of resource demands and cultural or community identities.

Alternatives 5, 6, and 7 reflect those changing dynamics and community identity needs with management emphasis for certain lands based on the relative "urban" or "rural" character of the surrounding (non-BLM) land uses within the planning area. This concept is meant to capture the relationship of BLM-administered lands to the expected changes in population growth and development in different parts of the planning area –including some differences in management emphasis that relate to the conflicts, demands, and cultural values of the diverse communities within the planning area. This distinction depends on the changing conditions of the surrounding land uses rather than a strict geographic or demographic interpretation of current conditions. Therefore, there is no hard-and-fast line dividing these areas. In general, BLM administered lands within the planning area considered "urban" have one of the following characteristics:

- They are adjacent to urban or rural population centers – including high density non-conforming rural land uses, residential or resort zoning, or small acreage development;
- They are in areas where non-public land ownership tends to be highly fragmented, and flanked or surrounded by BLM-administered lands.

Those lands considered "rural" in the planning area generally have the following characteristics:

- They are adjacent to large blocks of agricultural zones and uses;
- The public ownership may be fragmented, often without public access, but usually surrounded by low density development associated with rural agricultural rather than rural residential or small acreage developments;
- The public lands are in generally large contiguous blocks adjacent to national forests and grasslands or other BLM-administered lands to the east.

Conflict and Demand

All of the alternatives are concerned with balancing conflict and demand. As described in the issues, the need to revise the B/LP RMP is based largely on unanticipated potential conflicts with or the changing and increasing variety of resource demands in this area. This is especially apparent between recreational user groups and between adjacent rural or urban residents and public land use such as motorized recreation, livestock grazing, and mineral development.

Land Uses – Livestock Grazing and Mineral Development

The Issue Teams developed a conceptual framework to evaluate the conditions under which livestock grazing and mineral sales would generally be made available during the planning cycle. The framework considers—on a broad scale—factors that contribute to both the potential for conflict and the potential demand or importance of those uses. The criteria developed by the Issue Teams was used for Alternatives 2-6, and modified in Alternative 7, the Preferred Alternative. The criteria were modified by the Preferred Alternative Subcommittee during the consensus process on the Preferred Alternative and were recommended to be included in the Preferred Alternative by the Deschutes Provincial Advisory Committee (see Chapter 5).

Recreation – Emphasis, Travel and Access Management, and Season of Use

Conflicts in the planning area occur between public land visitors and adjacent landowners as well as between different types of recreationists (e.g., motorized vs. non-motorized users). Conflicts also occur between similar recreational visitors, such as when a motorized trail system becomes crowded and results in unsafe conditions (dust, poor visibility, large number of encounters). The demand for meeting multiple recreation needs is increasing. The UDRMP approaches the issue of conflicts by designating different areas for different users or by separating different trail users in a particular area by creating separate motorized and non-motorized route systems. These travel management designations vary by geographic area in each alternative and are based on the potential for conflict, recreational demand, or other resource concerns.

The recreation emphasis designations include:

- Multiple use shared facilities – combines motorized and non-motorized users on the same roads, trails, or trailheads in the same area.
- Multiple use separate facilities – combines uses in the same area, but provides some level of separate facilities.
- Non-motorized recreation emphasis – emphasizes shared use in the same area, with motorized use limited to roads and trails provided for non-motorized use.
- Non-motorized recreation exclusive – closes the area to motorized use and emphasizes non-motorized trail use. Motorized use in the area only for administrative requirements or to access recreation facilities.[1]
- Non-recreation emphasis – these include tracts of BLM-administered lands that are managed for research purposes (i.e., RNAs) or as administrative sites or leases.
- Roads only emphasis – areas where any trail development is unlikely to occur within the planning cycle due to location, size or fragmented nature of the public land parcel.

Travel management designations of Open, Limited, or Closed are applied to motorized off-road use as required by BLM policy. The B/LP RMP applies a specific designation to each geographic area that compliments the recreational emphasis of that area. Each travel management designation also has a season of use associated with motorized travel in the area (see also Glossary for definitions of Open, Limited, and Closed).

[1] Note that only BLM-lands and rights-of-way under BLM jurisdiction may be closed to motorized use under this designation. County roads or state highways are not subject to this designation unless specifically noted.

Ecosystem Health and Diversity

Vegetation

The alternatives compare the following management emphases:

"Current Distribution" reflects a management emphasis on shaping vegetative communities to rehabilitate specific areas or to achieve specific resource objectives in priority areas. The assumption is that caring for resources in this way will produce spin-off benefits for all human needs, including ecological, social and economic. For example, the primary objectives of a vegetation restoration project could be seeding forbs to restore a foraging area for sage grouse or cutting sagebrush to improve habitat for Peck's milkvetch. There would be no emphasis on treating landscapes to expand plant communities toward a "pre-European" range, although pre-European conditions may be replicated in some areas. In reality, some high priority areas would overlap and be treated similarly to the strategy employed under "historic" management. However, treatment units and habitat patch sizes would generally be smaller and overall project treatment acres would be fewer than under the historic emphasis. Prescribed fire and mechanical techniques would be used in concert to achieve desired objectives. Key plant communities and habitat types would be treated to achieve optimum productivity, diversity, or some other specified objective identified at the project level. Use of mechanical treatments as a tool would be emphasized in wildland-urban interface areas.

"Historic Range of Variability" reflects more emphasis on a return toward "pre-European" conditions and distribution. While this does not mean replicating exact conditions from a selected date in the past, this approach manages the ecosystem for a combination of patterns, patch sizes, species distribution, and seral stages that are consistent with expected fire frequency, intensity and distribution. Historic condition and distribution is a management strategy derived from the assumption that ecosystems were in equilibrium and functioning as they were intended based on evolutionary adaptations that occurred under the influence of natural geologic, climatic, and ecological processes. Use of prescribed fire can come closer to approximating those conditions than most mechanical treatment approaches, so fire would be emphasized as a management tool where practical. There would be an emphasis on managing juniper within its inherent role on the landscape, restoring many areas where young juniper have encroached to an earlier seral condition. Vegetation treatments would be designed to limit juniper occupancy to those fire-resistant areas and at historic densities. Historic condition, structure and composition of old-growth juniper woodland, ponderosa pine stands, meadows, and riparian communities would be restored and expanded to their historic ranges where practical. Use of mechanical treatments would be emphasized in wildland-urban interface areas. These areas may depart from historic conditions in some cases to facilitate fire-safe communities.

Wildlife

Some of the issues that influenced the development of these alternatives include habitat patch size, quality, connectedness and human disturbance effects in relation to meeting species needs. The public's interest in how these lands are used also played a role in shaping the alternatives by influencing the development of conservation measures or mitigations to help resolve conflicts between commodity and recreational uses and the needs of a variety of wildlife species.

"The conservation of wildlife and of biological diversity at large has taken various approaches in the U.S. Sometimes the focus is on the provisions of life requisites for a single species of plant or animal, such as spotted owls, elk or grizzly bears. Sometimes it is on the provision of habitats for a suite of species, i.e., a guild or biological community, such as cavity-dependent or wetland-associated animals. And sometimes the focus is

on ecosystems, i.e., integrated systems of land, water, and biota in contiguous areas, e.g., watersheds, landscapes, or regions" (Johnson and O'Neil, 2001). In general, this plan uses all three of these approaches for management and assessment of wildlife resources.

In this plan management considerations are directed at some individual species such as bald eagles, sage grouse, deer, elk and pronghorn, and at groups of species addressed by the use of source habitats such as shrub-steppe, juniper woodlands and riparian habitats. The Standards and Guides represent an ecological approach for integrating livestock use with wildlife needs, and is an integral part of these approaches.

The approach this plan has taken is to generally follow a system of single- and multi-species management emphases to enable the resource management plan and environmental impact statement to: address both single- and multi-species needs depending on objectives; identify broad-scale patterns of habitat change that affect multiple species in a similar manner; address the needs of many species efficiently; and describe the management of some individual species of high public interest.

Source Habitats

The source habitat management concepts used in this plan have been adapted from the strategy developed in the Interior Columbia Basin Ecosystem Management Project (ICBEMP) for managing terrestrial source habitats. This ties management approaches taken in this Resource Management Plan to the scientific information developed as a part of the ICBEMP, which was a larger-scale assessment and management strategy that encompassed this planning area.

Source habitats are those characteristics of vegetation that contribute to a species' population maintenance or growth over time and within an area. These source habitats are described using the dominant vegetation cover type and the structural stage, various combinations of which make up the source habitats for the terrestrial families[2] and provide the range of vegetation conditions required by these species for cover, food, reproduction, and other needs.

The source habitat component of the UDRMP has been developed to consider and provide habitat for productive and diverse populations and communities of plant and animal species; provide for recovery of listed species; provide habitat capable of supporting harvestable resources; and provide for habitats on BLM administered lands. The purpose of providing management direction regarding source habitats is to change declining trends in terrestrial habitats by maintaining important vegetation characteristics (such as plant species composition, rangeland and forest vegetation structure, snags, and coarse woody debris), which various terrestrial species need to survive and reproduce.

Management direction for source habitat occurs in Alternatives 2 through 7, and has two different approaches that are linked to the vegetation management approaches of using current versus historic distribution. The first approach, used in Alternatives 2, 4 and 5, would manage for source habitats only within their current geographic distribution and would impart a greater emphasis on continuing to provide cover for deer and elk where it currently exists, regardless of whether that reflected an historic distribution of cover components in the planning area. The second approach, used in Alternatives 3, 6, and 7, would manage for source habitats in their historic geographic distribution, by increasing their current geographic distribution, and improving connectivity and patch size (typically for shrub-steppe habitats, and to a lesser degree ponderosa pine habitats, but typically decreasing the amount and distribution of juniper woodlands and lodgepole pine habitats). The "historic" approach emphasizes biological diversity where management is focused more on maintaining and restoring conditions similar to those developed by natural disturbance processes.

[2] Family (of groups) – a collection of groups of species that share general similarities in source habitats, with similarities arranged along major vegetative themes that are conventionally addressed by managers (Wisdom et. al., 2000).

Habitat Effectiveness

It is possible that areas containing abundant source habitats may not support persistent populations of some species because of disturbance and fragmentation primarily associated with roads; for instance, source habitats may contribute to positive or stationary population growth, but the road effect may override the habitat effect, thereby resulting in a sink environment[3] (Wisdom *et al.*, 2000, p. 5).

Habitats contribute more to wildlife populations depending on the condition and this can be displayed in terms of "habitat effectiveness." Habitat effectiveness can be influenced by a number of factors, such as plant species composition, structural condition (quality), patch size, location (juxtaposition), and the amount of disturbance (caused by people). For this planning effort, the analysis focuses on the effectiveness of habitat that contributes to species of focus[4]. The approach used in this plan is to identify source habitats by general vegetation types and to display habitat effectiveness by alternative as it relates to the amount of influence of open roads and un-fragmented patch size.

Wildlife Emphasis Levels

Common to Alternatives 2 - 7 have objectives for management of wildlife that are included in one of three management emphasis levels – primary, secondary or minor. These objectives and guidelines would be expected to benefit all species of focus (e.g. ungulates, neotropical migratory birds, special status species, etc.). The main techniques used for managing for wildlife under the different emphasis levels include:

- Seasonal closure
- Distance buffers
- Habitat effectiveness
- Motorized travel route densities
- Un-fragmented habitat patch size
- Priority for restoration treatments
- Miscellaneous conditions for use (i.e., group use requirements for recreation, no site occupancy stipulations for mining)

Definitions and guidelines for the different wildlife emphasis area are as follows:

[3] A *sink environment* is the composite of all environmental conditions occurring in a specified area and time that results in negative population growth (Wisdom, et. al., 2000).

[4] *Species of focus* are vertebrate species for which there is ongoing concern about population or habitat status. We used four criteria to develop the list of species that were the focus of our planning and assessment. For this planning effort species were included if they met any of the following:

- Species that are included in the Special Status Species Policy (6840) which includes: federally listed threatened, endangered, proposed or candidate species; Bureau Sensitive, Assessment, or Tracking Species; and State listed species.
- Species of local interest, such as deer, elk, pronghorn and golden eagles.

Additionally, some species were selected from the following sources if there was a source habitat that was lacking a species (for coarse-scale analysis) in order to display the effects of the alternatives.

- Species that were identified in Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin (Wisdom et. al., 2000) and occur in the planning area.
- Species the Oregon-Washington Partners In Flight identified as having significant population declines.

Primary wildlife emphasis means wildlife is one of the most important management considerations for an area. Areas allocated to primary emphasis are intended to benefit wildlife and retain high wildlife use by applying one or more of the following guidelines:

- Target habitat effectiveness[5] for a geographic area at 70 percent or greater;
- Where possible, maintain large, un-fragmented patches (1000 to 2,000 acres);
- Target low densities of open motorized travel routes ($\leq$1.5 mi/mi^2)
- Rate as a high priority for habitat restoration treatments.

Secondary wildlife emphasis is where wildlife is one of several resource management programs that are of focus in an area, and typically receive a slightly lower, but still significant, level of management consideration. Areas allocated to a secondary emphasis are intended to support wildlife and maintain a moderate amount of use. The following management guidelines reflect a lower degree of importance than primary emphasis areas:

- Target habitat effectiveness for a geographic area at 50 percent or greater,
- maintain moderate size un-fragmented habitat patches(400 to 800 acres),
- target moderate densities of open motorized travel routes ($\leq$2.5 mi/mi^2).

Minor wildlife emphasis occurs where wildlife typically receives a lower level of consideration to most other resource management programs. These areas, as a whole, should still contribute to species occurrence and distribution, but typically are not the focus of intense management efforts for wildlife. Generally, guidelines are tied to minimum legal requirements identified in the sections on "common" guidance (Standards for Rangeland Health, BLM Special Status Species Policy (6840)), and the Threatened and Endangered Species Act.

Alternatives Overview

There are seven alternatives under consideration for the Draft Resource Management Plan. This includes one "No Action/No Change" Alternative, and six "action" alternatives (including the Preferred Alternative) that would reflect various levels of change from continuing the existing Brothers-La Pine Resource Management Plan direction. All alternatives would include continuing direction that is not being revised (Common to All Alternatives). Elements that do not vary between the action alternatives are located in the Common to Alternatives 2 – 7. All of the "action" alternatives make an effort to develop a "balance" of uses, and so it is difficult to characterize them in summary. Generally, none of the alternatives eliminates any one type of use entirely. In many cases, if a use is more limited in one geographic area in a particular alternative, there may be an increase in that use elsewhere in the planning area in the same alternative to try and keep that balance of uses present in each alternative.

[5] Habitat effectiveness is used as an index to measure the percentage of available habitat that is usable by elk and is used as a guideline for some alternatives. The Habitat Effectiveness Index for Elk on Blue Mountain Winter Ranges developed by Thomas *et al.* (1988) will be used with modifications developed from findings in Rowland *et al.* (2000) to assess effects related to motorized vehicles.

Alternative 1 – No Action/No Change

This section describes the current management direction provided by the existing Resource Management Plans (RMPs) and decisions applicable to the Upper Deschutes Planning area. This alternative includes existing direction for the Millican OHV area from the Millican OHV Environmental Assessment and Millican litigation settlement agreement.

Common to Alternatives 2 through 7

Some changes to the current management would be adopted in Alternatives 2 – 7. These decisions would reflect elements such as changes in use or management approaches that are consistent across Alternatives 2 – 7.

Alternative 2

This alternative would have the least amount of overall change from current management. In general, this alternative would continue a mix of uses throughout the planning area, resolving conflicts on a case-by-case basis rather than by separating uses, or applying specific conflict and demand thresholds. Alternative 2 would emphasize providing multiple use in the same areas.

Alternative 3

This alternative increases emphasis on reducing conflicts between human uses and wildlife habitat management objectives, and separating recreational uses. It relies on the use of Areas of Critical Environmental Concern (ACECs) as a management strategy to meet wildlife and other management objectives. This alternative places a greater focus managing for primary or secondary wildlife habitats with a primary or secondary emphasis across the planning area than does Alternative 2.

Alternative 4

Alternative 4 combines the approaches used in Alternatives 2 and 3, and includes more of an emphasis on providing for recreation opportunities (more than Alternative 3, but less than 2) in areas and during seasons when the demand is greatest. This alternative would also place a greater emphasis than Alternative 2 on reducing conflict between land uses and other users or adjacent residents**.** Recreation uses would be more separated than Alternative 2, but less than Alternative 3, and there would be an emphasis on certain types of recreation over others within geographic subdivisions. ACECs would provide special management objectives that emphasize ecosystem and wildlife habitat management, but these areas would generally be smaller or less frequently distributed across the planning area than in Alternative 3.

Alternative 5

Alternative 5 would utilize the "urban/rural" concept discussed earlier. The emphasis would be to focus reduced or lower conflict activities and higher quality wildlife habitat within the "urban" areas (generally includes most of Deschutes and Jefferson counties). There would be limited use of ACEC direction to protect resources, and more reliance on broad-scale conservation approaches across the planning area.

Alternative 6

Alternative 6 takes an approach that, in contrast to Alternative 5, emphasizes the future of effective wildlife habitats outside of the areas most likely to be affected by residential and urban development. This alternative puts less emphasis on reducing conflicts between land uses, recreational users, and residents in the "urban" areas adjacent to residential areas than does Alternative 5. More emphasis is on reduced conflicts between wildlife management objectives and human activities away from residential development areas in the "rural" areas (generally includes most of Crook County).

Alternative 7 (Preferred Alternative)

Alternative 7 is based in part on areas of consensus developed with our Issue Teams. It takes an approach that combines various features of the previous alternatives. It places more of an emphasis on primary and secondary wildlife habitat emphasis areas in the SE or "rural" portion of the planning area in the area of the greatest potential concentrations of species needs, but also allows the opportunity for increased amounts of year-round motorized use in much of that area. It emphasizes more separation of recreational uses than shared uses, and on providing large blocks of contiguous lands relatively equally balanced across the planning area for those separated recreation uses. Alternative 7 would modify the "conflict and demand" threshold criteria used in "Common to Alternatives 2 - 7" to determine areas available for continued grazing use during the life of the plan.

Rationale for the Preferred Alternative

The Preferred Alternative reflects a number of areas of consensus from the collaborative process used to develop this plan. These include:

- Ecosystem Health and Diversity – a broad scale conservation approach to management of Old Growth Juniper[6], and a modified boundary on expanded Peck's Milkvetch ACEC
- Transportation – designation of transportation corridors north and south of the City of Redmond
- Land Uses – decision matrix developed to evaluate and categorize allotments for present and future decisions about continuing grazing within those allotments and areas available for salable mineral extraction (tied to expanded Peck's Milkvetch ACEC boundary location); and areas and criteria for military training use.
- Recreation – motorized use Limited to designated roads and trails
- Land Ownership – lands designated for future community expansion (CE), conceptual agreements on configuration of Z-1, Z-2 lands.

The Preferred Alternative builds on areas of consensus identified during the planning effort and reflects a balance of uses that would meet the needs of local communities as well as national mandates for management of public lands. It provides a mix of management emphases that recognizes the individual identities and social and economic values of the local communities. It will meet long term military training needs and provide a flexible framework for managing livestock grazing that responds to changing

[6] Note there was not consensus that this approach was sufficient to protect this resource, but there was agreement that the broad scale approach met at least a minimum level of protection.

conflicts and demands. The Preferred Alternative would also provide reasonable mitigation for urban and rural residents while still providing for traditional uses like livestock grazing and salable mineral material site development. It would provide for separated motorized and non-motorized recreation uses that are roughly equal across the planning area,[7] and that offer opportunities in close proximity to urban areas as well as larger blocks of public lands for uses father from urban centers. The Preferred Alternative would integrate recreation and wildlife management objectives throughout the planning area.

The Preferred Alternative also includes elements that support current scientific approaches to ecosystem management and an aggressive approach to management of hazardous fuels in the urban interface. It would establish a proactive framework for managing present and future at-risk significant archeological resources. It would also include an approach for determining future areas available for firearm use integrated with local governments, reduce risk to neighbors, and provide for firearm uses that would complement desired recreation experiences.

Comparing the Alternatives

The alternatives can be compared by examining the key components described below and displayed in Table 2-1, Comparison of Alternatives.

Ecosystem Health and Diversity

- *Vegetation condition*-the six action alternatives use one of two approaches for vegetation management emphasis. The emphasis is on either restoring the physical extent and structure of vegetation within a historic range of variability (Alternatives 3, 6, and 7) or on improving the structure or condition of vegetation in key areas within its current range (Alternatives 2, 4, and 5). Key differences to these approaches are reflected by the priority, type and amount of expected treatments in certain riparian and upland vegetation types over the life of the plan.

- *Wildlife* – Wildlife Emphasis Levels level (primary, secondary, minor) and allowable uses within and adjacent to important wildlife habitats.

- Areas designated as Special Management Areas (Areas of Critical Environmental Concern, Wilderness Study Areas, Research Natural Areas, and Caves).

[7] Note that North Millican would continue to be operated under current seasonal and trail density requirements until a site-specific trail development plan that would meet plan objectives was completed.

Land Uses

- Livestock grazing and Minerals – Areas available for livestock grazing and salable mineral operations related to the potential for conflict with other uses on public or adjacent private land.
- Forest and range products – Differences reflected in the volume available per acre.
- Military uses – Areas available for long term or rotational military use.

Recreation

Different recreational opportunities vary by recreation emphasis, type of use, and season of use. These include required travel management designations of Open, Limited, or Closed.

Transportation

Regional transportation corridors would be allocated to meet local and regional needs. The local transportation system would be comprised of collector roads identified as part of the designated long-term road system and local roads available for future designation or closure.

Land Ownership

Different mixes of lands retained in public ownership wuold be made available to either meet different community needs, or available for trade or sale to further long-term land ownership objectives.

Public Health and Safety

Different areas would be available, closed to firearm discharge, or closed unless legally[8] hunting. Wildfire management related to campfires is also briefly addressed in this issue area.

Alternatives Considered in Detail

This section contains a summary description of the each of the seven alternatives that are explained in full detail in Appendix A. It includes a description of each alternative in terms of the key management direction and a brief summary of expected outcomes. This section references those elements that are not revised in this plan (see Appendix A -Common to All Alternatives). It includes a brief discussion of the elements that are changes to the existing management direction but do not vary within the "action" alternatives (see also Appendix A, Common to Alternatives 2 – 7), besides the descriptions of the Alternatives.

[8]For the purposes of this plan, "legally hunting" refers to the seasonally permitted hunting of game. "Hunting" is defined as "To take or attempt to take any wildlife by means involving the use of a weapon or with the assistance of any mammal or bird (ORS 496.004 (10))."

Goals and Management Direction Common to All Alternatives

The following sections summarize the key Goals and Management Direction that have bearing on the alternatives described later in this chapter.

Goals Common to All Alternatives

This section describes general overall Goals for resource management direction. Goals are broad, overarching purposes for which the BLM are mandated to administer public lands. These generally describe the legal basis and management direction provided to the agency by the Laws, BLM policy and Program Direction, and they apply to all alternatives.

Ecosystem Health and Diversity

Restore and support healthy ecosystems in conjunction with vegetation and wildlife habitat needs, riparian conservation strategies, watershed restoration methods, and economic reliance of the population on public lands. Management actions would emphasize ecosystem sustainability and health throughout the planning area, while managing for expected increases in human population and use levels.

The role of fire in the ecosystem would be recognized and the agency would establish resource values at risk categories that provide guidance for fire suppression and fuels treatments, particularly in the wildland urban interface. Periodic fire would be managed to maintain the disturbance cycle.

Land Uses

Manage the land in a manner that recognizes the nation's need for domestic sources of minerals, food, timber, and fiber from the public lands. At the same time, the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resources, and archeological values would be protected. Public lands are preserved and protected in their natural condition, where appropriate; food and habitat for fish and wildlife and domestic animals is provided; and land is available for outdoor recreation and human occupancy and use.

Visual Resources

Identify and protect visual values on public lands, assuring integrating environmental design arts in planning and decision-making.

Recreation

Provide a broad spectrum of resource-dependent recreation opportunities to meet the needs and demands of public land visitors, while ensuring the continued availability of public lands and related waters for a diversity of resource-dependent outdoor recreation opportunities. More intensive visitor management, resource protection, and facility investments are provided where the public has demonstrated its desire to use public lands for outdoor recreation, and outdoor recreation is a high priority.

Transportation and Utilities

Provide transportation and access facilities that protect public safety, provide user safety, protect the environment, conserve and protect resources, and enhance to productivity and use of public lands. Identify facilities as part of an approved transportation plan to allow for allocation of construction and maintenance funds; and minimize damage to scenic and esthetic values, fish and wildlife habitat and otherwise protect the environment.

Collaborate with local communities to plan reasonable, safe access to or across public land if necessary, in a manner that serves to protect and conserve sensitive resources and the environment.

Regional Transportation Planning

Develop and maintain functional and efficient regional transportation systems coordinated with State, local and BLM jurisdictions that provide links between local communities by considering land allocation needs for regional transportation corridors in conjunction with multiple resource management.

Local Transportation Planning

Provide reasonable access for recreation, fire, safety and resource management that meet desired conditions for access management.

Land Ownership

Retain public lands in federal ownership, unless disposal or acquisition of a particular parcel would better serve the national interest and the needs of state and local people, including needs for lands for the economy, community expansion, recreation areas, food, fiber, minerals, and fish and wildlife. Changes in public land ownership are considered where consistent with public land management policy and where these changes would result in improved management efficiency.

Withdrawals are used to dedicate public lands to specific uses by protecting specific resource values over the development of lesser values. Lands may be segregated from some or all of the public land laws and/or location and entry under the mining laws. Withdrawals are also used to transfer jurisdiction over an area of Federal land from one department, bureau, or agency to another department, bureau, or agency after alternative realty tools have been considered (such as a rights-of-way reservation) and found inadequate.[9]

Public Health and Safety

The agency provides the public with recreation areas and facilities that are free from recognized hazards insofar as practical, and meets the requirements of BLM Manual H-2111 – 1, 2001: Safety and Health Management in accordance with safety policies and procedures.

Archaeology

Cultural resources are located, protected and preserved in accordance with existing legal authorities.

[9]Departmental Manual 603.1.1 addresses specific guidance to the BLM for managing the withdrawal program that includes making, modifying, and revoking withdrawals. The manual also addresses post withdrawal management objectives and stresses the periodic review of existing withdrawals.

Management Direction Common to All Alternatives

Generally, management direction Common to All Alternatives reflects the baseline management conditions mandated by BLM policy and those portions of the B/LP RMP that are not revised by this RMP, but will be carried forward as management direction under all alternatives and provide an implementation baseline. These have been summarized below under each issue category and in Table 2-1, Comparison of Alternatives, and Appendix C, Management Guidance Continued in This Document. Appendix A provides more detail on this direction as it would appear in the proposed Upper Deschutes RMP.

Ecosystem Health and Diversity

Vegetation

The Standards for Rangeland Health (BLM, 1997) were incorporated into the B/LP RMP and are considered to be the most current primary guidance for ecosystem management and serve to meet the intent of FLPMA and other relevant BLM policy concerning the management of vegetation, wildlife habitat, special status species, watersheds, and water quality.

The BLM would promote healthy sustainable rangeland, woodland, and forest ecosystems and accelerate restoration and improvement of public lands, as directed by the rangeland health regulations (43 CFR 4180). These regulations specify that the BLM shall assure the following:

- Watersheds are in, or are making significant progress toward properly functioning physical condition, including their upland, riparian-wetland, and aquatic components.
- Soil and plant conditions support infiltration, soil moisture storage and the release of water that are in balance with climate and landform and maintain or improve water quality, water quantity and the timing and duration of flow.
- Ecological processes, including the hydrologic cycle, nutrient cycle and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.
- Water quality complies with State water quality standards and achieves, or is making significant progress toward achieving, established BLM objectives such as meeting wildlife needs.
- Habitats are, or are making significant progress toward being, restored or maintained for Federal threatened and endangered species, Federal Proposed, Category 1 and 2 Federal candidate and other special status species.

Noxious Weeds

Due to the rapid expansion of noxious and other non-native weeds in portions of the planning area, all alternatives would emphasize maintaining noxious weed-free plant communities or restoring plant communities with noxious weed infestations through use of on-going broad-scale integrated weed management strategies. Efforts would also be made to control or manage other undesirable, non-native or invasive species.

Wildlife

Consistent with the requirements of the Endangered Species Act (1973), all alternatives would ensure that actions are consistent with the conservation needs of special status species. They would not contribute to the need to list special status species or jeopardize the continued existence of listed species. Where practical, the BLM would seek opportunities to conserve and improve special status species and habitats for native wildlife in the development of land use plans, activity plans, and in other BLM authorized, funded or approved activities (BLM Manual 6840- Special Status Species Management, Endangered Species Act).

To achieve this objective, the BLM would use habitat modification techniques such as mowing of shrubs, prescribed burning, livestock grazing and commercial and non-commercial cutting of trees to maintain or improve special status species habitat. The agency would also minimize disturbance actions to reduce negative effects to federally listed or proposed species during seasonally sensitive periods (i.e. breeding, nesting, winter roosting, etc.). Actions that could cause a disturbance would generally be managed using either year round or seasonal restrictions, and/or distance buffers. Specific restrictions include, but are not limited to, human activities (such as recreation), range management, timber operations, and mining, which would not be allowed within ¼ to ½ half mile of active bald eagle nest sites and nearby perches from January 1 to August 31 (see Table 2-2, Seasonal Restriction and Distance Buffers, for a list of other species that have required seasonal restrictions, seasonal restriction dates and distance buffers). Winter roosts would also be managed using seasonal restriction dates.

Table 2-2. General Guidelines[1] forSeasonal Restriction and Distance Buffers

Species	Habitat	Range or Maximum Spatial Buffer	Range of Restriction Dates (may be shorter period0
Bald Eagle	Nest	¼ mile non-line of sight ½ mi line of sight 1.0 mile blasting	January 1 – August 31
	Winter Roosts	½ mile	December 1 – April 1
Golden Eagle	Nest and	¼ to ½ mile	February 1 – August 31
			February 1 – August 31
N. Goshawk	Nest	¼ mile of current nest, or ½ mile of previous year's nest	March 1 – August 31
Cooper's Hawk	Nest	¼ mile	March 1 – August 31
Sharp-shinned Hawk	Nest	¼ mile	March 1 – August 31
Ferruginous Hawk	Nest	½ mi direct line of sight ¼ mi with visual buffer	March 1 – August 1
R.T. Hawk	Nest	¼ mile	March 1 – August 31
Swainson's Hawk	Nest	¼ - ½ mile	April 1 – August 31
Peregrine Falcon	Nest	1.0 mile	January 1 – August 15
Prairie Falcon	Nest	¼ - ½ mile	March 15 – August 15
Osprey	Nest	¼ mile	March 1 – August 31
Burrowing Owl	Nest	¼ mile	March 1 – August 31
Flammulated owl	Nest	¼ mile	April 1 – September 30
Great Gray Owl	Nest	¼ mile	March 1 – July 31
Sage Grouse	Lekking	0.6 mile (660 ft) - 0.25 mile	March 1st – May 15 * February 15– May 1
Sage Grouse	Nesting/Brooding/Rearing		April 1 – July 31
			June 1- September 30
Sage Grouse	Winter Habitat		November 15 – March 15 *November 1– March 31
Great Blue Heron	Nest	660 ft – ¼ mile	15 March – 15 July
Mule Deer	Winter Range		01 December – 30 April *01 November – 01 May
Rocky Mountain Elk	Winter Range		01 December – 30 April *01December – 01 May
	Calving		May 15 – June 30
Pronghorn	Winter Range		01 December – 30 April *01 November – 01 April
Townsend's Big-eared Bat	Hibernaculum		November 1 – April 15
	Nursery		April 15 – October 31

* Millican Dates

[1]These general guidelines are only examples of typical restrictions. Spoecific dates and distances may vary depending on the type of action proposed and the local breeding chronology of species or the local weather patterns.

As directed in BLM Manual 6840-Special Status Species Management, all alternatives would take actions that progress toward the conditions indicating attainment of the Fundamentals of Rangeland Health (described in 43 CFR 4180.1) and associated Standards (43 CFR 4180.2). Such actions would include management that restores, protects or enhances habitats to support healthy, productive and diverse populations and communities of native plants and animals (including special status species and species of local importance) appropriate to soil, climate and landform. The same techniques that apply to special status species habitat modification would also apply to native species habitat restoration or maintenance. A current inventory of wildlife species and resources would facilitate this on-going management and future planning needs, and would include systematic population inventories, as well as monitoring and evaluating known populations and habitats.

Common to All Alternatives would be specific guidance for maintaining and restoring special habitat features that provide unique contributions to a variety of species. These features include, but are not limited to, caves, cliffs, and riparian habitats.

For management direction of Pictograph Cave, some guidelines may vary, but all alternatives would provide seasonal closures during the winter hibernation period to protect Townsend's big-eared bat.

Geographic Areas

Wildlife Emphasis Areas
There are a few areas where wildlife would be managed with a primary emphasis under all alternatives, although the methods to achieve them may vary. These areas include all of Badlands, Horse Ridge and Smith Rock geographic areas and parts of Prineville Reservoir (Wild and Scenic River Corridor and Eagle Rock areas), Steamboat Rock (Wild and Scenic River and WSA), and Tumalo (northern block) geographic areas. These areas together include approximately 70,442 acres (Badlands-29,590 ac.; Horse Ridge-24,766 ac.; Prineville Reservoir-4,684 ac.; Smith Rock-2,110 ac.; Steamboat Rock-5,100 ac.; and Tumalo-4,192 ac.) of wildlife habitats that are well distributed across the planning area, and these areas comprise 17 percent of BLM administered lands within the planning area.

In the geographic areas, habitat modifications, improvements and disturbance actions would be managed with specific attention to the species residing in each area. Key habitat components that would be emphasized would include: winter range, seasonal migration corridors, breeding sites, roosting sites, and foraging habitats and adjacent to raptor nest sites.

Habitat Modification
Vegetative habitats would be maintained or improved by reducing the amount of undesirable native and non-native plant species. Recent and past timber harvest in the La Pine area has increased the amount of grass production (approx. 6800 AUMs) and it is available for livestock grazing on a temporary basis until the timber stands become re-established. Priority allocation of this additional vegetation would be to first meet wildlife and riparian area objectives.

Disturbance Actions
Human activities on BLM administered lands would be managed to maintain functional wildlife migration or travel corridors where these functional habitats exist, given the surrounding land use conditions.

Hydrology

All alternatives would be managed to include measures to protect or restore natural riparian functions[10]. Management techniques would maintain or improve current good to excellent streambank stability and riparian vegetative condition. Riparian habitat needs would be considered in developing livestock grazing systems and pasture designs and would be evaluated according to the Fundamentals of Rangeland Health. Soils would also be managed to maintain productivity and to minimize erosion. Under all alternatives, allotments would be evaluated according to the Fundamentals of Rangeland Health to ensure water quality complies with State Standards and achieves, or is making significant progress toward achieving, established BLM objectives.

In addition, in compliance with The "Federal Water Pollution Control Act" (commonly known as the "Clean Water Act" [CWA]) of 1977, as amended, existing water quality would be maintained or enhanced consistent with or exceeding Oregon's water quality management plans. As outlined in the Memorandum of Understanding between the BLM and DEQ (see Appendix), the BLM would comply with the Federal CWA and the State DEQ's program by employing the joint USFS and BLM protocol for addressing CWA section 303(d) listed waters. One goal of the strategy is to address all waters on BLM-administered lands generally within the timeline established by the State of Oregon DEQ. The BLM would take actions relative to 303(d) listed waterbodies in accordance with the protocol as outline in Appendix C (Protocol for 303(d) listed streams). Management practices such as grazing, mining, recreation, timber harvesting, and other forms of vegetation management for restoring and maintaining water quality would be designed for healthy sustainable and functional rangeland ecosystems as described in Standards for Rangeland Health, 1997.

Special Management Areas

Special Management Areas within the Upper Deschutes Plan area include Areas of Critical Environmental Concern (ACEC), Research Natural Areas (RNA), Wilderness Study Areas (WSA), and Caves. Each of these areas has special management direction that reflects the values for which each of these areas or sites are managed. Specific management direction that is provided for Wild and Scenic Rivers and river corridors within the planning area boundary remains in place is provided in the W&SR Plans prepared since the adoption of the B/LP RMP.

Areas of Critical Environmental Concern (ACECs)

ACECs are areas containing specific resources that would benefit from some form of special management. In the Upper Deschutes area, some of the ACECs designated in the past have additional overlying designations. These include two RNAs (which are also ACECs), the Badlands WSA (a portion of which is also an ACEC), and the Chimney Rock segment of the Lower Crooked Wild and Scenic (W&S) River (a portion of which is an ACEC).

In all alternatives, management actions would be designed to not impair the values for which the ACEC was designated. Existing ACECs would be retained where relevance and importance criteria continue to be met, and new ACECs would be designated where special management is required to protect the identified values. Unless specifically addressed in other guidance, uses that do not adversely affect the values for which the ACEC was designated would be allowed to continue.

[10] As defined by Executive Orders 11988 and 11990 and the Oregon-Washington Riparian Plan (1987).

The following areas met the criteria and were designated as ACECs in the B/LP RMP: Badlands, Horse Ridge (RNA), Lower Crooked River, Peck''s Milkvetch, Powell Butte (RNA) and Wagon Roads. Objectives/standards and guidelines vary according to the ACEC; however, actions would be designed to maintain the value(s) for which these ACECs were designated (see B/LP RMP pages 52 – 72 for specific allowable uses and guidelines outlined for each ACEC). Acres shown below for individual ACECs are based on new estimates obtained from GIS technology. A total of approximately 24,543 acres were designated for ACECs in the B/LP RMP and are not changed by this RMP.

Badlands ACEC (16,684 acres)
The values for which this ACEC was designated would be maintained, with all uses contributing toward the attainment of this objective. Specific values include primitive recreation opportunities, geologic formations, a prehistoric river canyon and pictographs, and old-growth juniper woodland.

Horse Ridge ACEC/RNA/ISA (609 acres)
The Horse Ridge ACEC/RNA Natural Area Management Plan (April 1996) established two objectives: 1) To maintain the natural condition of the western juniper/big sagebrush/threadleaf sedge community; and 2) To encourage use of the Natural Area for scientific research and college-level educational opportunities in a manner which will not degrade the natural ecological conditions or processes.

Peck's Milkvetch ACEC (4,073 acres)
The designation of the existing Peck's Milkvetch ACEC (4,073 acres) would be continued to provide conditions that emphasize and protect populations of Peck's milkvetch, a plant listed as Threatened by the State of Oregon. A detailed management plan for the area would be completed, which would specify the management required for Peck's milkvetch.

Livestock grazing would continue to be authorized with implementation of deferred rotation grazing management, allowing grazing only after Peck's milkvetch dormancy at least every other year. Other grazing systems would be allowed if research and monitoring show they would not adversely affect the plant. Prescribed fire, as well as suppression activities, would be allowed, providing restrictions or stipulations were designed to maintain or enhance special values. The ACEC would be consistent with the District's Fire Management Plan.

Mineral development would be allowed providing restrictions or stipulations are designed to maintain or enhance special values. OHV use would also be allowed providing restrictions or stipulations are designed to maintain or enhance special values (e.g., travel limited to designated roads and trails). The collection of rocks (rockhounding) would be allowed but with restrictions/stipulations designed to maintain or enhance special values. Public land within the 1989 boundaries of the ACEC would be retained in Federal ownership.

Firewood harvest would not be allowed. The ACEC is also identified in B/LP RMP (1989) as a right-of-way (ROW) avoidance area. New ROW alignments would be avoided in the area to the extent possible.

Powell Butte ACEC/RNA (510 acres)
No objectives/standards were established through the B/LP RMP. A detailed management plan for the area would be completed which would specify the management required for the plant communities represented by this natural area. In particular, a plan of operation must be submitted and approved before the issuance of any sales contracts or free use permits for mineral materials.

Wagon Roads ACEC (90 acres)
The integrity and interpretive resources of the segment of the historic Huntington Road (Wagon Roads ACEC) located in Township 17, Range 12, Section 1 (see Map 7, Special Management Areas) would continue to be highlighted and protected. This 1.25-mile segment covers 90 acres, including a 300-foot buffer on either side to protect associated historic features.

Common to All Alternatives, livestock grazing would be allowed if consistent with ACEC goals and in accordance with Standards for Rangeland Health and Guidelines for Grazing Management. All forms of non-motorized, primitive recreation would be permitted except for horseback riding and non-motorized vehicle use along the road alignment south of McGrath road. Opportunities for the designation of a pedestrian trail system with interpretive signs would be pursued. OHV use along the historic road south of McGrath Road would not be allowed.

In all alternatives, wildfire would be fought aggressively if fire was within, or threatening the ACEC. Fire lines would not be constructed within the ACEC and surface disturbance would be kept to the minimum amount necessary. Prescribed fire would not be allowed. Rockhounding would not be allowed. New rights-of-way would be discouraged.

Badlands ACEC (16,684 acres)
Designation of the Badlands ACEC) would continue, and management activities would continue to emphasize the values for which this area was designated, including primitive recreation opportunities, geologic formations, a prehistoric river canyon, pictographs and old-growth juniper woodland. While most activities are allowed in the ACEC, mineral leasing is not, Common to All Alternatives.

Research Natural Areas (RNAs)

All alternatives would continue to provide components of the national system of RNAs. The Oregon Natural Heritage Act calls for the establishment of a "discrete and limited system" of natural heritage conservation areas, which have "substantially retained their natural character" and which "represent the full range of Oregon''s natural heritage resources."

Specifically, under Common to All Alternatives, the agency would continue the designation of Horse Ridge (609 acres) and Powell Butte (510 acres) as ACEC/RNAs. Suppression activities would be allowed with restrictions or stipulations designed to maintain or enhance special values. Prescribed natural fire and prescribed fire would be allowed in the Horse Ridge and Powell Butte ACEC/RNAs. OHV use would not be allowed. New road construction and rights-of-way would not be allowed.

For all ACECs, including those additionally designated as RNAs, BLM would improve the availability of public information about these areas. This would include, but not be limited to improved boundary marking, publication of management guidelines and reasons for designation, and a general increase in public awareness.

Horse Ridge ACEC/RNA
Livestock grazing would not be allowed within the Horse Ridge ACEC/RNA. The Horse Ridge ACEC/RNA area is withdrawn from locatable mineral entry under the 1872 mining laws. Surface occupancy for fluid mineral leasing would not be allowed. Geophysical exploration would be restricted protect the natural values for which the RNA was designated. Rockhounding would not be allowed.

Powell Butte RNA
Plans of operation must be submitted and approved prior to any development of mining claims in the Powell Butte RNA. Approved plans of operation would have stipulations to

protect the values of this RNA. Surface occupancy for fluid mineral leasing would not be allowed. Geophysical exploration would also be restricted protect the natural values for which the RNA was designated. Rockhounding would not be allowed.

Wilderness Study Areas
Under all alternatives, WSAs and Instant Study Areas (ISAs; i.e., Horse Ridge ACEC/RNA) would be managed to maintain wilderness suitability consistent with the 1995 "Interim Management Policy for Lands under Wilderness Review" (B/LP RMP).

All WSAs and ISAs would be closed to mineral leasing. Plans of operations must be submitted prior to the development of any mining claims. Approved plans of operation must meet the non-impairment standard of the IMP. Geophysical exploration would also be restricted to protect wilderness suitability.

Any inholdings that are acquired within a WSA/ISA would be managed in a manner similar to the surrounding WSA/ISA.

Any WSA/ISA released from wilderness study via legislation and not designated as wilderness would no longer be subject to the IMP, and would be managed under general BLM management policies and applicable use plans. For a majority of the Badlands WSA, this would include the Badlands ACEC management policy. For the majority of the Steelhead Falls WSA, this would include the Middle Deschutes Wild and Scenic River Management Plan policy.

Caves
Caves nominated for significance or determined significant would be managed with an emphasis on educational, research, and protection of cave resources. Under all alternatives, activities and use would be managed to not impair the nominated values for which the cave may be determined significant.

Nominated caves within the planning area determined to be Significant under the FCRPA (with the year of determination) are included in Appendix A.

All remaining caves that have been nominated for Significant cave status will be reviewed, and a determination made whether or not they qualify as a significant cave (see Appendix A for lists of allowable and prohibited activities).

Land Uses

Livestock Grazing

All alternatives would provide for continued livestock grazing, while reducing conflicts with and meeting needs of other uses and resources.

Per 43 CFR 4180.2, where livestock grazing is found to be a significant factor in not achieving Standards for Rangeland Health, actions to control intensity, duration, and timing of grazing and/or provide for periodic deferment and/or exclusion would be required to meet physiological requirements of key plant species and to meet other resource objectives. Upon determining that existing grazing management practices on public land are significantly contributing to the nonattainment of resource objectives, appropriate actions would be implemented.

The intent of grazing management is to leave sufficient herbaceous material in most areas, to provide soil and watershed protection, to provide forage and cover for wildlife, maintain or improve forage quality for livestock and wildlife, and to meet other resource objectives. The current grazing systems (Appendix G) would be maintained until analysis or evaluation of monitoring data or rangeland health assessments identify, or

other events (such as livestock operational changes) dictate a need for adjustments to meet objectives. Applicable activity plans (including existing allotment management plans, agreements, decisions and/or terms and conditions of grazing use authorizations) would be revised and implemented to ensure that resource objectives are being met.

The level of AUMs of specified grazing use in the alternatives is based on the average authorized AUMs using the years 1990, 1995, and 2000, compared to active preference AUMs. However, livestock permittees have the option to license up to their full active preference (displayed in Appendix G) for any given year. Total active preference for the planning area is 38,726 AUMs under B/LP RMP direction (or 22,612 AUMs under the current situation; see further explanation in Chapter 4). Permittees seldom use their full active preference for a variety of reasons, including previous agreements with BLM, management prescriptions in implemented AMPs, economic factors, and forage and water availability.

All areas currently closed to livestock grazing would stay closed.

Allotment Evaluation and Management

Monitoring studies and allotment evaluations will be done on a schedule as outlined in the Oregon Rangeland Monitoring Handbook (H-1734-2). Current direction is to perform an allotment evaluation every 5 years for I category allotments and every 10 years for M category allotments (see description of allotment categorization process in Chapter 3). The C category allotments will be monitored and evaluated as needed.

Monitoring studies include recording actual use; forage utilization; soil stability; trends in vegetative density, cover, and composition; and ecological site inventory data. During allotment evaluations, interdisciplinary teams review monitoring information and examine and propose changes to allotment goals, forage allocation, allotment category, and grazing systems.

In 1997, the Standards for Rangeland Health and Guidelines for Grazing Management (BLM 1997) were adopted by the BLM and incorporated into existing plans. The Standards meet the intent of 43 CFR 4180 (rangeland health regulations), which contain the objectives to "…promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions… and to provide for the sustainability of the western livestock industry and communities that are dependent upon healthy, productive public rangelands."

The Standards are the basis for assessing and monitoring rangeland conditions and trend. The assessments evaluate the standards and are conducted by an interdisciplinary team with participation from permittees and other interested parties. The complete "Standards for Rangeland Health and Guidelines for Livestock Grazing Management" can be found at http://www.or.blm.gov/Resources/Rangelands/s-gfinal.htm.

Based on 43 CFR 4180.2, if livestock are significantly contributing to the nonattainment of a standard, or management does not conform with the guidelines, as soon as practical but not later than the start of the next grazing season, management will be implemented to ensure that significant progress is being made toward attainment of the standard(s), and/or conformance with the guidelines.

The Prineville District BLM expects to complete rangeland health assessments (per direction in 43 CFR 4180 and Standards for Rangeland Health) on all District allotments by 2008.

Allotment Management Plans (AMPs) are sometimes developed for larger I or M category allotments. An AMP prescribes the manner and extent that livestock grazing

is conducted to meet multiple use, sustained yield, economic, and other objectives. A grazing system is generally incorporated into the plan. An AMP is implemented when it is incorporated into the permit and accepted by the permittee, and is operational when supporting range improvements and the grazing system have been initiated.

Rangeland Developments

Rangeland developments are proposed as part of the allotment evaluation process, and as a result of other reviews, to assist in attaining resource management goals. Various rangeland developments have been implemented to provide livestock forage, improve livestock distribution, improve rangeland health, improve soil stability, improve wildlife habitats, improve wildlife/livestock forage, and to restrict livestock from certain areas. As mandated in FLPMA and PRIA, a portion of the grazing fees is invested in range developments with the expectation that these projects may benefit wildlife, watersheds, and livestock producers. Livestock operators, state and Federal agencies, and other interested public entities have continued to fund rangeland improvement construction.

Minerals

Under all alternatives, leasable, saleable and locatable mineral prospecting, exploration, and development on BLM administered lands would be allowed, while protecting other land values. Public lands open to mineral uses may be explored and developed for mineral resources in accordance with the 43 CFR 3000 through 3800:

- Where not withdrawn from mineral entry or under discretionary closure;
- In a manner that would not cause unnecessary or undue degradation of the landscape; and
- In a manner consistent with applicable land use plans and Federal and state laws with respect to 1) air and water quality, 2) noise, 3) solid and liquid waste disposal, 4) fisheries, wildlife, and plant habitat, and 5) cultural and paleontological resources.

All alternatives would also allow for the following activities:

- 396,185 acres are available for locatable mineral entry under the 1872 mining laws.
- 366,640 acres are available for mineral leasing.
- All surface disturbances on to mineral operations, including disturbances resulting from casual use and operations under a notice or plan must be reclaimed. Reclamation shall include but is not limited to:
  1. Saving of topsoil for final application after reshaping of disturbed areas has been completed;
  2. Measures to control erosion, landslides, and water runoff, and the spread of noxious weeds;
  3. Measures to isolate, remove, or control toxic materials;
  4. Reshaping of the area disturbed, application of the topsoil, and re-vegetation of the disturbed areas, where reasonably practical; and
  5. Rehabilitation of fisheries and wildlife habitat.
- Surface occupancy for fluid mineral leasing is not allowed on 16,480 acres surrounding Prineville Reservoir.
- All reserved federal mineral estate (federally owned minerals in non-federally owned lands) would remain open to mineral exploration and development.

Coal, coal bed methane, oil shale, and tar sands are considered absent from the planning area, and are not addressed in this RMP.

Public lands would be made available for recreational rock collecting consistent with the FLMPA requirements for outdoor recreation opportunities while protecting the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water, and archeological values; preserving and protecting public lands in their natural condition, where appropriate; and providing food and habitat for fish, wildlife, and domestic animals. The collection of rocks, invertebrate fossils and mineral specimens including petrified wood would be allowed in reasonable amounts for non-commercial use only. Collection of petrified wood without charge is restricted to 25 pounds plus one piece per person per day and may not exceed 250 pounds per year. Quotas from multiple persons would not be allowed to be pooled to remove pieces larger than 250 pounds. No petrified wood specimen weighing more than 250 pounds shall be removed without a permit from the authorized officer, and no person shall use explosives or mechanical devices (except metal detectors) to aid in the collection of rock materials.

The North Ochoco Reservoir, Eagle Rock, and the portion of the Fischer Canyon site east of Highway 27 would continue to be managed for rockhounding uses.

Forest Products

In accordance with FLPMA, forests and woodlands would be managed to provide for social and economic values, including wood products, consistent with ecosystem sustainability and management objectives.

Approximately 41,110 acres of commercial forestland in the La Pine block and approximately 1,080 acres of commercial forestland in the northern area would be managed in a sustainable manner to ensure the availability of forest products in perpetuity for social/economic needs. The harvest of up to 2,000 cords of firewood and other wood products from the approximately 170,000 acres of juniper woodlands within the planning area would be allowed.

As a condition of the conveyance of 1,768 acres within La Pine State Park to the Oregon Parks and Recreation Department, BLM retained title to all present and future vegetative resources on these parcels. To this end, vegetation management actions would be designed to help the goals and objectives of the Oregon Parks and Recreation Department.

Military Uses

In agreement with the Oregon Military Department, all alternatives would ensure consistency of planned and approved activities with environmental requirements, integrated resource management plans, and conflict resolution with neighbors on public lands authorized for long-term and short-term military use.

Visual Resources

VRM Class designations will be made for the planning area and will be used to evaluate the visual resource impact of all surface disturbing projects. For all alternatives, the Badlands WSA, Steelhead Falls WSA, and the Horse Ridge ACEC/RNA/ISA are designated as VRM Class 1 (see Appendix H for definition of VRM Classes).

Recreation

Motorized and non-motorized recreation would be managed to provide visitor satisfaction, protect natural resources, provide visitor safety, and minimize conflicts among various users and neighbors.

There are relatively few areas of common travel management designations for all alternatives (including the no-action alternative). This is partially due to the lack of Open designations in the action alternatives, and also due to the differences in Limited designations made in the B/LP RMP versus those made in the UDRMP (e.g., new seasonal or type of vehicle limitations). The travel management designations that are common to all alternatives include:

A. Areas designated as Limited (i.e., use limited to designated trails and/or roads, use limited seasonally, etc.) including portions of Cline Buttes, North Millican, and the Sanford Creek area south of Prineville Reservoir are designated as Limited throughout all alternatives. However, there are important distinctions between some of the alternatives on the types of limitations applied to these areas – so these areas are not managed in a common manner throughout all alternatives.

B. Areas designated as Closed to motor vehicles including, but not limited to, BLM administered lands adjacent to Smith Rock State Park; lands atop Powell Butte; several small parcels near urban areas, including Redmond Caves (Redmond), Barnes Butte (Prineville), and the airport allotment and Rickard Road areas (Bend); the Horse Ridge ACEC/RNA; and several parcels located along the Middle Deschutes River southwest of Redmond.

Other elements Common to All Alternatives:

- The BLM would continue to pursue a cooperative agreement to manage the area known as the ODOT pit. If acquired, the BLM would develop the site as a permanent casual-use staging area, and the hillclimb areas behind the play area would be closed, but the play area itself would be Open year-round.
- Roads and other areas in the area known as the Cinder Pit would be managed as follows:
  1. One casual use staging area would be developed in the North Area at the cinder pit. This staging area would have a graveled parking area, loading ramp, and an information bulletin board.
  2. A warm-up area would be developed at the cinder pit. The area would consist of about a 35-acre area, with ten acres fenced and signed, primarily for use by children.
  3. The hillclimb area at the cinder pit would be maintained.
- Roads and/or trails located on private property that is acquired through exchanges, sales, or acquisition of easements would be evaluated for addition to the road and trail system. Priority would be given to roads that provide key linkages or provide loop opportunities, or roads and trails that would replace other routes with resource or safety concerns.
- An event staging area, the West Butte Road Staging Area, would be developed; and a staging and warm-up area near or at 4-Corners would be developed.

Special Recreation Permits and R&PP Leases

All alternatives would provide opportunities for recreation services to be provided by others on BLM administered lands. Special Recreation Permits would be required for all commercial and competitive uses on public lands. All alternatives would allow for R&PP (Recreation and Public Purposes Act) leases to provide for recreation opportunities managed by others (e.g., shooting ranges), and would provide for rockhounding opportunities, by managing specific areas for rockhounding use (see Minerals, Rockhounding for details).

Transportation and Utilities

Current BLM direction for management of transportation systems and other rights-of-way continues to be substantially represented in the B/LP RMP, and is carried forward under all alternatives. Pertinent direction related to regional and local transportation systems and other rights-of-way is summarized below.

All alternatives would continue to emphasize identifying and designating transportation systems, utility corridors, or other rights-of-way to minimize environmental impacts, and consolidate uses wherever possible. Areas within runway protection zones of existing airports are identified and uses and developments within those areas on BLM administered lands are allowed if they are suitable to preserve the clearance needs. Areas of Critical Environmental Concern, Wilderness Study Areas and Congressionally Designated Areas are exclusion areas for new developments, and sites with known special status species plant or animal species, cultural resources, or sensitive visual resources are avoidance areas that may require special mitigation measures. Anticipated future regional utility corridor needs identified in B/LP RMP continue to be represented by maintaining a "Western Regional Utility potential corridor" designation within the planning area if they have not been developed since 1989.

Land Ownership

Under all alternatives, lands would be identified for retention (having high resource values); retention but able to be disposed of through exchange for lands with higher public values; and disposal (do not provide substantial public or tribal benefit).

Lands for retention, including those public lands in Wild and Scenic River areas, identified for retention in the Middle Deschutes/Lower Crooked River (Chimney Rock Segment) Management Plan and designated in the Brothers/La Pine Resource Management Plan would remain Z-1,[11] and all habitat essential for the survival and recovery of any federally listed or proposed species or BLM sensitive species, including historic habitat that has retained its potential to sustain listed species and is deemed to be essential for species survival (BLM Manual 6840- Special Status Species Management). Trading of land to acquire habitats of equal or better in value would also be considered.

All lands selected for disposal in B/LP RMP would continue as Z-3 and qualify for the purposes of BACA. These lands include isolated parcels between Bend and Redmond, isolated parcels around Prineville, and isolated parcels northwest of La Pine.[12]

All alternatives would emphasize providing land for community needs and uses consistent with public land management mandates. In addition, the agency could use easements to compliment acquisitions, in lieu of acquisition for conservation or access as appropriate to further public management objectives (see also Appendix D for Lands Classified as Disposal, Withdrawal, and Acquisition). All withdrawals would continue as displayed in Map 1.

All withdrawals affecting the planning unit would be reviewed periodically to insure the lands being utilized are consistent with the purpose for which the lands were withdrawn. Lands found suitable for return to the public domain shall be restored to entry and managed according to management prescriptions for lands having similar resource values. All new withdrawal proposals would be considered on a case-by-case basis, including land use needs of other Federal agencies.

[11] Early in the process these public lands were placed outside the scope because they had more recent plans that met Congressional mandates. However, specific acquisition parcels were not identified in the river plans, and have, consequently, been identified in this plan.

[12] Under BACA, the money derived from the sale of qualifying public lands may be made available to purchase private lands in the same area.

Public Health and Safety

The B/LP RMP does not address the issue of firearms within the planning area, although it acknowledges that hunting occurs throughout the planning area. Subsequent Federal Register firearm closures have been established to protect wildlife resources and other natural and cultural features, reduce vandalism, and to improve public safety. These closures include closures for raptor nesting seasons at Badlands Rock and Fryrear Road, and high use closures at Rosland OHV area and Mayfield Pond.

Archaeology

In compliance with The Archaeological Resources Protection Act, as amended, and the National Historic Preservation Act (NHPA), as amended, all alternatives would emphasize locating, protecting and preserving archaeological resources in accordance with existing legal authorities and policies, with a special emphasis on "At-Risk" significant archaeological resources.

Alternative 1

The Brothers/La Pine Resource Management Plan (ROD 1989) describes in general terms how resources will be managed, the order in which projects will be implemented, and what support will be needed to manage those resources. In general, this plan provides a broad framework for multiple use public land management and makes land use allocations, establishes production goals and protects valuable resources.

While the Upper Deschutes Management Plan expresses desired outcomes and/or desired conditions in terms of goals, objectives and guidelines, this format was not originally used in the B/LP RMP. Alternative 1 retains the original design used in the B/LP RMP and describes general management directions, rather than specific objectives and guidelines. These format changes make it difficult to compare Alternative 1 to any of the alternatives.

This is direction that would be changed or eliminated from the action alternatives (CT 2 -7, individual alternatives). Unless specifically stated, rationale for direction described in Alternative 1 can be found in the B/LP RMP. Additional rationale, when necessary, will be listed in this alternative. This alternative also assumes inclusion of all elements listed in the Common to All section.

Ecosystem Health and Diversity

The B/LP RMP addresses most vegetation issues from the perspective of land treatments. Management direction allows a variety of vegetation manipulation techniques, by habitat type, to improve the ecological condition of the land in the long-term. Habitat-specific vegetation guidelines are listed under each sub-issue heading described below.

For wildlife, two of the overall goals of the B/LP RMP are to provide for commodity production while protecting natural values, and to provide optimum habitat diversity for game and non-game wildlife species. In addition, the B/LP RMP proposes to meet ODFW management objective numbers for deer and elk in the planning area. Specific management direction and guidelines can be found under the headings below.

Management actions within riparian areas would include measures to protect or restore natural functions, and would maintain or improve current good to excellent streambank stability and riparian vegetative condition.

Vegetation

Ecosystem Maintenance and Restoration
See "Land Treatment" pages 88 – 90 in the B/LP RMP.

Special Status Plants
Management direction includes allowing activities that would benefit special status species through habitat improvement, and prohibiting actions that would not meet "no effect" criteria.

Noxious Weeds
Management direction for the control of noxious weeds was limited in the B/LPRMP pending direction from the proposed "Vegetation Management on BLM Lands in the 13 Western States Environmental Impact Statement." However, management direction stressed controlling the weed infestations already present on public lands, and using a variety of control methods including grazing management, chemical/mechanical treatments, and thermal or biological methods to achieve this goal.

Shrub-Steppe
While the B/LP RMP did not specifically address shrub-steppe habitat, guidelines for this type of vegetation include using techniques like spraying and burning to control shrubs, and conducting shrub control treatments only after an allotment assessment has been completed. See "Juniper and Shrub Control" (pages 88-89, B/LP RMP 1989) for a complete description of shrub control methods and specific guidelines. In addition, refer to "Brush Control" and "Standard Operating Procedures" for direction for additional vegetation management guidelines.

Western Juniper
See "Juniper and Shrub Control" (pages 88-89, B/LP RMP, 1989) for a complete description of juniper control methods and specific guidelines.

Lodgepole and Ponderosa Pine Forests
Land Uses-–—Forest Products, below.

Soil Productivity
Soils would be managed to maintain productivity and minimize erosion. Disturbed soil would be rehabilitated to blend into the surrounding soil surface and reseeded as necessary.

Wildlife

Wildlife Habitat
The primary management direction is to protect or improve important wildlife habitat offering food, water and shelter during all seasons of the year. In addition, management actions should protect, maintain or enhance the habitat of special status animal species.

- Approximately 160,627 acres (40% of plan area) would be managed at a level similar to primary emphasis; 55,618 acres/(15%) at a level similar to a secondary emphasis; and 187,075 acres/(46%) at a level similar to a minor emphasis (see Table 2 , Wildlife Emphasis Areas, Alternative 1 and Tables 2-5 to 2-11 for further detail).

- Habitat management plans would be written for high priority wildlife habitats (such as bald eagles and sage grouse). These plans would detail how those habitats would be improved or maintained.

- "Agricultural use of public land could be authorized if the use does not conflict with riparian area management; important wildlife habitat …and the use would maintain or enhance…all habitat requirements for game and non-game species" (B/LP RMP, p.29).

- Recreational activities that involve motorized vehicles driving off roads and trails could occur as long as they do not create significant adverse impacts to resource values, and this includes all of the La Pine area. Public lands where significant damage to soils, vegetation, wildlife, or visual qualities would either be limited or closed (see B/LP RMP Map 18, Wildlife Habitat, pages 94-95, for acreages).

Special Status Species
Management activities in the habitat of listed or candidate threatened or endangered and sensitive species would be designed specifically to benefit those species through habitat improvement (see B/LP RMP, p. 122 for additional guidelines and consultation recommendations):

- Maintain or improve habitats of other naturally occurring or locally important species. Provide adequate habitat conservation measures for both vegetation altering and disturbance related activities (see B/LP RMP (p. 92-97) for specific deer, elk and pronghorn management objective numbers).

- No land tenure adjustments, programs or other activities would be permitted in the habitat of listed or candidate threatened or endangered species that would jeopardize the continued existence of such species. All land tenure adjustments must consider habitats for threatened, endangered and sensitive species; important deer, elk and pronghorn seasonal habitats; nesting and breeding habitats for all wildlife; and riparian habitat.

- The anticipated long-term forage available to wildlife in the Brothers area would accommodate ODFW proposed population increases of 27 percent for deer, 23 percent for pronghorn and 71 percent for elk based on 1980 population counts.

- The grazing systems implemented in deer and pronghorn winter range are to improve or maintain habitat conditions on 97 percent of the crucial deer winter range and 95 percent of the crucial pronghorn winter range based on 1982 conditions (B/LP RMP p. 97).

- In crucial wildlife habitat (winter ranges, fawning/calving areas, sage grouse nest areas, etc.), construction work would be scheduled during the appropriate season to avoid or minimize disturbances. In addition, wildlife needs would govern the size and design of the projects (B/LP RMP, p. 90).

- The Millican Off-Road Vehicle Area would be managed in accordance with the interim court decision (1999), where there are seasonal closures and limited motorized vehicle access to protect wildlife (in particular, deer, elk, pronghorn and sage grouse winter habitat).

- All new fences would be built to standard Bureau wildlife specifications to allow wildlife passage and existing fences would be modified as appropriate (B/LP RMP, p. 97).

Table 2-4. Wildlife Emphasis Summary

Wildlife Emphasis Areas - Alternative 1

	Primary Percent/# acres	Secondary Percent/# acres	Minor Percent/# acres	Totals Percent/# acres
All Wildlife Emphasis Areas	40% / 160,627 ac.	14% / 55,618 ac.	46% / 187,075 ac.	100% / 403,320 ac.
Golden Eagles	41% / 16,203 ac.	00% / 00 ac.	59% / 23,764 ac.	100% / 39,967 ac.
Sage Grouse	100% / 77,600 ac.	00% / 00 ac.	00% / 00 ac.	100% / 77,600 ac.
Elk	48% / 86,568 ac.	00% / 00 ac.	52% / 93,604 ac.	100% / 180,170 ac.
Deer	60% / 158,736 ac.	08% / 19,726 ac.	32% / 85,046 ac.	100% / 263,508 ac.
Pronghorn	39% / 65,195 ac.	< 01% / 38 ac.	61% / 101,945 ac.	100% / 167,180 ac.
Migration and Connectivity	51% / 35,944 ac.	16% / 11,118 ac.	33% / 22,878 ac.	100% / 69,940 ac.

Table 2-5. Wildlife Emphasis Areas - Alternative 1 - Mule Deer.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29590 100.00%	0 0.00%	0 0.00%	29590
Cline Buttes	0 0.00%	0 0.00%	15267 100.00%	15267
Horse Ridge	24769 100.00%	0 0.00%	0 0.00%	24769
Mayfield	0 0.00%	0 0.00%	1589 100.00%	1589
Millican Plateau	0 0.00%	19726 37.44%	32957 62.56%	52683
North Millican	53766 100.00%	0 0.00%	0 0.00%	53766
Prineville	2673 30.32%	0 0.00%	6142 69.68%	8815
Prineville Reservoir	18981 48.08%	0 0.00%	20494 51.92%	39475
Smith Rock	2110 100.00%	0 0.00%	0 0.00%	2110
South Millican	17555 100.00%	0 0.00%	0 0.00%	17555
Northwest	0 0.00%	0 0.00%	6745 100.00%	6745
Steamboat Rock	5100 95.29%	0 0.00%	252 4.71%	5352
Tumalo	4192 72.38%	0 0.00%	1600 27.62%	5792
TOTAL	**158736** **60.24%**	**19726** **7.49%**	**85046** **32.27%**	**263508**

Table 2-6. Wildlife Emphasis Areas - Alternative 1 - Rocky Mountain Elk.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29615	0	0	29615
	100.00%	0.00%	0.00%	
Bend/Redmond	0	0	0	0
Cline Buttes	0	0	29,157	29,157
	0.00%	0.00%	100.00%	
Horse Ridge	5484	0	0	5484
	100.00%	0.00%	0.00%	
Lapine	0	0	30708	30708
	0.00%	0.00%	100.00%	
Mayfield	0	0	439	439
	0.00%	0.00%	100.00%	
Millican Plateau	0	0	15105	15105
	0.00%	0.00%	100.00%	
North Millican	34673	0	0	34673
	100.00%	0.00%	0.00%	
Prineville	0	0	939	939
	0.00%	0.00%	100.00%	
Prineville Reservoir	8320	0	3374	11694
	71.15%	0.00%	28.85%	
Smith Rock	0	0	0	0
	0	0	0	
South Millican	0	0	4834	4834
	0.00%	0.00%	100.00%	
Northwest	0	0	6745	6745
	0.00%	0.00%	100.00%	
Steamboat Rock	4284	0	687	4971
	86.18%	0.00%	13.82%	
Tumalo	4192	0	1616	5808
	72.18%	0.00%	27.82%	
TOTAL	**86,568**	**0**	**93,604**	**180172**
	48.05%	**0.00%**	**51.95%**	

Table 2-7. Wildlife Emphasis Areas - Alternative 1 - Golden Eagle.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	0	0	0	0
	0	0	0	
Bend/Redmond	0	0	128	128
	0.00%	0.00%	100.00%	
Cline Buttes	1,685	0	3,719	5,404
	31.18%	0.00%	68.82%	
Horse Ridge	502	0	1657	2159
	23.25%	0.00%	76.75%	
Lapine	0	0	0	0
	0	0	0	
Mayfield	0	0	0	0
	0	0	0	
Millican Plateau	978	0	8527	9505
	10.29%	0.00%	89.71%	
North Millican	2667	0	2194	4861
	54.87%	0.00%	45.13%	
Prineville	596	0	1333	1929
	30.90%	0.00%	69.10%	
Prineville Reservoir	3634	0	3427	7061
	51.47%	0.00%	48.53%	
Smith Rock	228	0	769	997
	22.87%	0.00%	77.13%	
South Millican	0	0	513	513
	0.00%	0.00%	100.00%	
Northwest	1038	0	0	1038
	100.00%	0.00%	0.00%	
Steamboat Rock	3950	0	354	4304
	91.78%	0.00%	8.22%	
Tumalo	925	0	1143	2068
	44.73%	0.00%	55.27%	
TOTAL	**16,203**	**0**	**23,764**	**39967**
	40.54%	**0.00%**	**59.46%**	

Table 2-8. Wildlife Emphasis Areas - Alternative 1 - Pronghorn.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	9379	0	0	9379
	100.00%	0.00%	0.00%	
Bend/Redmond	0	0	25948	25948
	0.00%	0.00%	100.00%	
Horse Ridge	19385	0	0	19385
	100.00%	0.00%	0.00%	
Mayfield	19090	38	5561	24689
	77.32%	0.15%	22.52%	
Millican Plateau	0	0	41235	41235
	0.00%	0.00%	100.00%	
North Millican	0	0	24519	24519
	0.00%	0.00%	100.00%	
Prineville	0	0	3130	3130
	0.00%	0.00%	100.00%	
Prineville Reservoir	0	0	1552	1552
	0.00%	0.00%	100.00%	
Smith Rock	0	0	0	0
	0	0	0	
South Millican	17341	0	0	17341
	100.00%	0.00%	0.00%	
Northwest	0	0	0	0
	0	0	0	
Steamboat Rock	0	0	0	0
	0	0	0	
Tumalo	0	0	0	0
	0		0	
TOTAL	**65195**	**38**	**101945**	**167178**
	39.00%	**0.02%**	**60.98%**	

Table 2-9. Wildlife Emphasis Areas - Alternative 1 - Migration and Connectivity Corridors.

Geographical Area	Species	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
La Pine	Deer	33657	0	6986	40643
		83%	0%	17%	
Badlands	Pronghorn	1777	11.8	1	1789.8
		99%	1%	0%	
Mayfield Pond	Pronghorn	0	0	4911.4	4911.4
		0%	0%	100%	
Millican Plateau	Pronghorn	0	0	9856.5	9856.5
		0%	0%	100%	
North Millican	Pronghorn	0	4039	0	4039
		0%	100%	0%	
Research Natural Area	Pronghorn	510	0	0	510
		100%	0%	0%	
Subtotals for Pronghorn		**2287**	**4050.8**	**14768.9**	**21106.7**
		11%	**19%**	**70%**	
Prineville	Elk	0	67.5	0	67.5
		0%	100%	0%	
Prineville Reservoir	Elk	0	7000	1122.6	8122.6
		0%	86%	14%	
Subtotals for Elk		**0**	**7067.5**	**1122.6**	**8190.1**
		0%	**86%**	**14%**	
Grand Totals for All Species		**35944**	**11118.3**	**22877.5**	**69939.8**
		51%	**16%**	**33%**	

Table 2-10. Wildlife Emphasis Areas - Alternative 1 - All Species' Habitats.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29615 100.00%	0 0.00%	0 0.00%	29615
Bend/Redmond	0 0.00%	0 0.00%	42146 100.00%	42146
Cline Buttes	0 0.00%	0 0.00%	31,864 100.00%	31,864
Horse Ridge	25167 100.00%	0 0.00%	0 0.00%	25167
Lapine	0 0.00%	33588 81.54%	7603 18.46%	41191
Mayfield	841 3.11%	6784 25.12%	19383 71.77%	27008
Millican Plateau	0 0.00%	15246 27.09%	41037 72.91%	56283
North Millican	54252 100.00%	0 0.00%	0 0.00%	54252
Prineville	2673 22.53%	0 0.00%	9189 77.47%	11862
Prineville Reservoir	18981 48.08%	0 0.00%	20494 51.92%	39475
Smith Rock	2119 100.00%	0 0.00%	0 0.00%	2119
South Millican	17687 100.00%	0 0.00%	0 0.00%	17687
Northwest	0 0.00%	0 0.00%	6745 100.00%	6745
Steamboat Rock	5100 42.16%	0 0.00%	6998 57.84%	12098
Tumalo	4192 72.18%	0 0.00%	1616 27.82%	5808
TOTAL	**160,627**	**55,618**	**187,075**	**403320**

Hydrology

Riparian
Riparian habitat needs would be considered in developing livestock grazing systems and pasture designs. Riparian areas in the Brothers portion would continue to be protected and managed to provide full vegetative potential. Riparian vegetation in the Brothers portion would be expected to improve on 75 percent of the stream riparian habitats.

- Livestock exclusion or restricted use along 46 miles of stream, 55 miles of stream stabilization, 620 stream structures and 15 acres of debris removal would improve fish habitat. Where fencing is not feasible, livestock use would be managed to achieve 60 percent of vegetative potential within 20 years.

Water Quality
Existing water quality would be maintained or enhanced consistent with or exceeding Oregon's water quality management plans. Allotments would be evaluated according to the Fundamentals of Rangeland Health to ensure water quality complies with state standards and achieves, or is making significant progress toward achieving, established BLM objectives.

- The BLM will meet the Federal CWA and the State DEQ's program by employing the joint USFS and BLM protocol for addressing CWA section 303(d) listed waters. One goal of the strategy is to address all waters on BLM-administered lands generally within the timeline established by the State of Oregon DEQ. The BLM will take actions relative to 303(d) listed waterbodies in accordance with the protocol as outline in Appendix C (Protocol for 303(d) listed streams).

- Livestock exclusion in the same area described in the riparian area above would maintain or improve water quality.

Watershed/Hydrologic Function
Soils would be managed to maintain productivity and to minimize erosion. Allotments would be evaluated according to the Fundamentals of Rangeland Health to ensure water quality complies with State Standards and achieves, or is making significant progress toward achieving, established BLM objectives.

Livestock grazing would be modified where the standard for watershed function is not being achieved, or where measurable progress is not being made toward achieving the standard.

Fire/Fuels Management

The Brothers/La Pine planning area was evaluated for damage to resource values by fire. Values at risk classes have been determined for the planning area and range from the lowest values at risk (Class 1) to the highest values at risk (Class 6, special consideration values at risk). Values at risk are the basis for determining fire suppression action. In addition, the Bear Creek Fire Use Plan (1983) provides for conditional suppression actions on approximately 107,000 acres in the Bear Creek Watershed.

Low-Moderate Risk Classes
Alternative 1 would allow for prescribed fire[13] to manage vegetation and habitat in low-moderate risk classes (1-3). The Interim Management Policy and Guidelines for Lands

[13] Prescribed fire refers not only to planned ignitions, but also unplanned ignitions that are allowed to burn under specific conditions. While not a "let-burn" policy, conditional fire areas have been designated as areas to allow a fire to continue burning under specific behavior parameters, such as rate of spread and air temperature. In the event that an unplanned ignition moves outside of condition fire prescription, aggressive suppression measures would be taken.

under Wilderness Review provides suppression guidelines for Wilderness Study Areas in the Planning Area (H – 8550-1, 7/5/95).

- Depending on circumstances, unplanned ignitions in fire risk classes 1-3 would be managed as prescribed fire, as long as the fire behavior falls within the conditional fire suppression parameters regarding size, air temperature, windspeed, flame length, etc.

- Prescribed fire would be carried out in accordance with approved fire management plans and appropriate smoke management and visibility goals and objectives.

Moderate-High Risk Classes
Unplanned ignitions in this risk class (4 – 6) would be aggressively suppressed.

- Rural or urban areas between high value public lands, particularly La Pine, Bend, Redmond, and Prineville areas, would be managed as top suppression areas. The interface areas are of special concern because of housing developments and adjacent high resource values.

- A timely post-burn review and evaluation in order to define any rehabilitation needs would be conducted.

Bear Creek Watershed
- Unplanned ignitions would burn under prescribed conditions, as long as District suppression forces are available to monitor and implement control actions as needed.

- Range developments would be protected.

- A maximum of four fires greater than 150 acres in size would be allowed to burn under prescribed conditions at any time.

Special Management Areas

ACECs

Lower Crooked River ACEC (2,592 acres)
The public lands would be managed in a manner that would ensure continued public use and enjoyment for a variety of recreation activities compatible with the protection and enhancement of the river's natural resources, including scenic quality. Also, high quality visitor services, including access roads, camping and day-use facilities, signs and interpretive information, would be provided.

Wagon Roads ACEC (191 acres)
Alternative 1 would continue to protect the integrity of the historic Huntington Road and provide for its use as in interpretive resource. B/LP RMP does not allow surface occupancy for fluid mineral leasing, and a withdrawal of this ACEC from mineral entry under the 1872 mining laws would be pursued.

Wilderness Study Areas/ISAs

No analysis of Wilderness Study Areas was included in the B/LP RMP. However, subsequent direction in addition to the Interim Management Plan can be found in the Millican OHV EA and Litigation Settlement Agreement (see detailed reference in the Analysis of the Management Situation, pages 129 – 130).

Caves

Pictograph (Stout) Cave
Pictograph Cave would be closed year-round to all visitation.

Land Uses

Livestock Grazing

Under current management, conflicts between livestock grazing and uses on public and adjacent private land are resolved on a case-by-case basis. There is no system in place to estimate potential for problems or to help the BLM prioritize where action is most needed to prevent future conflicts. There are no guidelines to help managers decide where potential conflicts are so high that livestock grazing might no longer be manageable under the current conditions (and there is a need to change conditions or discontinue livestock grazing).

After vegetation treatments (such as prescribed burns, seedings, juniper cuttings, weed treatments, et cetera) and wildfires, livestock grazing would not be permitted for the first full year and through the second growing season following the event (per 2002 decision briefing clarifying B/LP RMP direction). This would mean if the BLM used herbicides in the fall of year one to slow the spread of leafy spurge on 1 acre, the entire affected grazing allotment pasture would not be grazed by livestock until mid-July of year three. The field manager could adjust this restriction upon recommendation from an interdisciplinary team. Exceptions are not specified.

About 6,800 AUMs on 23,509 acres of scattered parcels in the La Pine area would be added to existing allotments or used to create new allotments (shown as Allotment #9999, unallotted La Pine, in Appendix G and on Map H), as directed by B/LP RMP. The RMP listed the fences, water, and other developments necessary to accomplish this.

The B/LP RMP also directed the allocation of an additional 6,800 AUMs deemed available as a result of increased forage production after timber treatments in the La Pine area. These timber-related AUMs were never allocated, and at this time the timber has begun to grow back, so not all of the forage is available at present. These AUMs are not displayed in Appendix G.

Many of the general management goals and direction were modified when the Standards for Rangeland Health were incorporated into the B/LP RMP in 1997 (see CTA section in this chapter). Direction that was not amended and that continues in this and all alternatives is described in the CTA section in this chapter, and displayed in Appendix C.

Minerals

Alternative 1 would provide for commodity production while protecting natural values, and allow development of locatable, leasable, and salable mineral resources across the entire planning area except in areas identified in the B/LP RMP as closed to mineral entry (see B/LP RMP, pages 107- 121, for specific minerals guidelines; also see Map S-22, Minerals Alternative 1). Under this alternative, approximately 403,910 acres would continue to be available for mineral material sales. Seasonal restrictions on all mineral operations would continue to apply to 52,587 acres. Surface occupancy for fluid mineral leasing would continue to not be allowed on 21,254 acres.

Forest Products

Decisions on timber harvest in the La Pine area would be made with four primary objectives: 1) reduction of extreme fire hazard; 2) salvage of dead and dying timber; 3) successful reforestation; and 4) increasing subsequent growth of commercial tree species. Specifically, in the La Pine portion, 14 MMBF of timber and 2,500 cords of firewood would be harvested annually. In the Brothers portion, 87 MMBF of timber and 2,000 cords of firewood would be harvested annually. Dead timber would be utilized to reduce extreme fire hazards while accommodating other resource values. Forestland would be managed to minimize losses or damage to commercial tree species from insects and disease. Maintaining or improving site productivity would be a basic objective in all forestry practices. Harvesting minor forest products, such as posts, poles, or firewood, would be guided by similar considerations.

Realty Permits/Military Uses

Alternative 1 would provide for commodity production while protecting natural values (B/LP RMP). Military training is currently permitted on approximately 28,858 acres.[14]

Visual Resources

The brothers Grazing Management Program EIS (1982) established VRM Class designations for the planning area, which were brought forward into the Brothers/La Pine RMP (1989). The following allocations were made in these plans:

VRM Class 1
The Horse Ridge ACEC/RNA/ISA is identified as VRM Class I in the Brothers Grazing Management Program EIS. Both the Badlands and Steelhead falls WSA are also designated as VRM Class 1 by National Policy adopted after the B/LP RMP was adopted in 1989.

VRM Class 2
Areas identified as VRM Class 2 include both sides of State Highway 20 at the Horse Ridge summit, and the Smith Rock block of BLM-administered lands.

VRM Class 3
In the Brothers Grazing Management Program EIS, the majority of the planning area located west of the Millican Valley OHV area is designated as VRM Class 3. This would include the geographic areas such as Cline Buttes, Bend-Redmond, Mayfield, Tumalo, Northwest, and Steamboat Rock.

VRM Class 4
The area generally encompassing the Millican Valley OHV area is designated as VRM Class 4, as is the Skeleton Fire area.

VRM Class 5
No areas were identified as VRM Class 5 (in need of rehabilitation).

Recreation

The B/LP RMP designated approximately 153,664 acres (38 percent) of the planning area as open to off-road vehicles. The travel management designations in the B/LP RMP have

[14] Several of the pre-GIS documents refer to the same area as 31,352 acres. The discrepancy is a calculation error that attributed full acreage to sections that do not have the standard number of acres per section.

been amended by additional planning decisions, including the Millican Valley Plan and associated Consent Judgment. These changes have generally resulted in greater acreages in the current planning area being designated as either Limited or Closed than originally in the B/LP RMP. Alternative 1 designates approximately 6,553 acres (1.6 percent) as closed to motor vehicles and approximately 227,379 acres (56 percent) as Limited. The travel management designations for Alternative 1 are shown on Map 8, Recreation Travel Access and Motorized Use Seasons (see pages 45-48 of the B/LP RMP for guidelines specific to geographic areas).

Because the B/LP RMP did not provide specific management direction for recreation use beyond the management of OHV and rockhounding use, management of these activities are generally the only ones with specific direction in Alternative 1 (see also Minerals Section, Rockhounding).

Geographic Areas

The B/LP RMP did not identify specific geographic areas similar to the UDRMP. However, Alternative 1 is described using these UDRMP geographic areas for ease of comparison.

Badlands

The Badlands WSA would be managed for motorized use on a designated system of inventoried routes, comprising 7.6 miles available year-round and 20.5 miles available seasonally. Including the above mentioned routes, approximately 49 miles of routes would be available for non-motorized recreation use.

- Motorized use would be limited to the following routes and seasons only:

1. Route 8 (approximately 8 miles)--Open to motor vehicles year-round.
2. Routes 4, 5, 6, and 7 (approximately 12 miles)--Open to motor vehicles between May 1 and November 30.

- Mountain bike use would be managed under IMP policy, which does not allow any vehicle off existing ways, trails, etc. IMP policy allows mechanical transport, including mountain bikes, only on existing ways and trails and "open" areas that were designated prior to the passage of FLPMA.

Bend/Redmond

The entire block is designated Open to motorized vehicles year-round.

Cline Buttes

- Cline Buttes block south of State Highway 126 designated as Limited to existing roads and trails year-round.

- Cline Buttes block north of State Highway 126 designated as Open

- Small parcels along Middle Deschutes are Closed to motorized vehicles.

- Youngs Avenue parcel east of Cline Buttes is designated Open year-round

Horse Ridge

- The Skeleton Fire Travel Management area is Limited to designated roads only, year-round.

- Continues Millican Plan policy that "No designated trails will be provided in Horse Ridge," but leaves possibility for future trail designation if easements or private land in center of area are acquired.

- A portion of Horse Ridge would be managed under provisions of the Millican Plan and the consent judgment, and other portions of Horse Ridge would be managed under provision of B/LP RMP; therefore, some of this area managed for designated roads and trails, with seasonal restrictions on both motorized and mechanized use, while other areas in Horse Ridge are Limited to existing routes and open year-round.

- The Horse Ridge ACEC/RNA is Closed to motor vehicles year-round.

La Pine

The entire area is designated as Open to motor vehicles.

Mayfield

Motorized Vehicle use is limited to a designated road system only in the area north of Alfalfa Market Road. The area south of Alfalfa Market Road is designated Open.

Millican Plateau
The area is Limited to existing Roads and Trails as per the Consent Judgment except: The remainder of the area located west of State Highway 27, east of Johnson Market Road, south of State Highway 26 and north of Reservoir Road is managed as limited to existing roads and trails.

The remainder of the area located east of State Highway 27 and north of Prineville Reservoir is designated as either Open, Closed, or Limited, with no boundaries that are recognizable on the ground.

North Millican

- The entire area would be managed as Limited to designated roads and trails; seasonally closed from December 1 to April 30.

- Roads and trails not identified in the designated trail system and not already identified as open to public use (such as county roads) would be evaluated and placed into one of the following categories:
  1. Roads that are closed to public use but would be available for administrative and emergency use.
  2. Trails and roads that would be closed and rehabilitated.
  3. Roads needed for continued public motorized us
  4. Roads that would be designated for, or converted to, non-motorized use.

- Non-competitive Use – Highway area (also known as the Deer Winter Range area in Millican Plan) is Open for casual motorized and mechanized use from May 1 to November 30 annually.

- Events for both motorized and non-motorized activities would be Limited according to the following seasonal restrictions:
  1. Entire Highway area would be Open to motorized and mechanized events during month of April and from October 1 through November 30 annually.
  2. Entire area would be Open year-round for non-motorized and non-mechanized use. Closure restrictions in deer winter range identified in Millican Plan would apply to horse-drawn carts (i.e. no horse-drawn carts from December 1 to April 30, except of course if they are used in an event during the month of April).

3. Events – no non-motorized/non-mechanized events would be allowed in Deer Winter Rangefrom December 1 through April 30 (as defined by Millican Decision Record).
4. Most of the area (i.e., the southern area and both sides of West Butte Road, also known as the area covered by the Millican OHV Area boundary) would be open for mountain bike events during April and from October 1 through November 30 each year, on designated road and trails only. The remainder of the area (i.e., West Butte and the area west of State Highway 27 and east of Juniper Acres subdivision) would be open for events year-round.

- Development of Horse Use staging area (for dispersed, primitive camping) in southeast portion of area, located off Road 6521, would occur.

- No designated, motorized trails would be developed in Rodman Rim area.

- Entire area would be managed as Limited to designated roads and trails, seasonally closed from December 1 through April 30, except for:
  1. Year-round routes would be open to street legal vehicles
  2. BLM lands on the eastern edge of the Southeast Area would be managed as Limited to existing routes and trails. This area includes lands east of the Millican Plan OHV area boundary, north of State Highway 20, west of State Highway 27, and south of Bear Creek/Reservoir Road.

- Most of the area (i.e., the southern area and both sides of West Butte Road, also referred to as the area covered by the Millican OHV Area boundary) would be open for OHV events during April and from October 1 through November 30 each year, on designated road and trails only. The remainder of the area (i.e., West Butte and the area west of State Highway 27 and east of Juniper Acres subdivision) would be open for events year-round.

- The entire area would be open for mountain bike use year-round[15]

Northwest

The area would be designated Open.

Prineville

All BLM lands in the area would be designated as Open year-round, except:

- 160 acre Barnes Butte Parcel would be designated Closed

- The southeast corner of the area (Eagle Rock area north of Prineville Reservoir) would be designated as Limited to existing roads.

Prineville Reservoir

- The southern two-thirds of the area would be designated as Open (as per B/LP RMP.

- The area adjacent to BOR managed lands south of Prineville Reservoir would be Limited to designated roads (post B/LP RMP EA) or Limited to designated roads and trails (B/LP RMP).

[15] Note: only the crucial deer winter range (i.e., North Millican west of West Butte Road) as shown in the Millican Plan is seasonally closed to mountain bikes.

Smith Rock

The entire block would be designated Closed to motor vehicles year-round (see Common to All Alternatives).

South Millican

- Millican would be Limited to designated roads and trails, with a seasonal closure (December 1 to July 31), as per the Consent Judgment.
- Primary staging area for casual use and event in the South Millican Area would be located approximately 1-½ miles west of Millican and one mile south of State Highway 20 (see Map 1, UDRMP Planning Area). Typical improvements would include bulletin board, loading ramp, and toilets as use levels warrant.
- The South Millican Area would remain as part of the larger Millican Valley OHV Area.

Steamboat Rock

- Main Steamboat Rock Block would be designated as Open, with year-round use.
- The BLM lands along the Deschutes and Crooked Rivers north of the main Steamboat Rock block (i.e., west and east of Crooked River Ranch) would be Limited to designated roads or routes.
- Isolated parcels northwest of Redmond would be designated as Open, with year-round use.

Tumalo

- Most of main block located north of Couch Market Road would be designated Limited to existing roads and trails.
- Small block south of Tumalo Reservoir would be designated Open.
- All BLM lands in the Tumalo Block are seasonally closed to motor vehicle use from December 1 to April 15.

Transportation and Utilities

All transportation and utilities direction contained in B/LP RMP and subsequent decisions would be carried forward through all of the alternatives (see Common to All Alternatives).

Regional Transportation

Alternative 1 would not specifically designate transportation corridors for regional transportation systems; however, applications for rights-of-way would be evaluated as required under law, and could potentially be granted after analysis. For the purposes of comparison to other alternatives, consistent with state requirements, the No Action alternative would mean no future rights-of-way. Under this alternative, urban needs would be assumed to be resolved within existing urban areas.

Land Ownership

Alternative 1 would maintain or increase public land holdings in Zones 1 and 2; exchange, or if exchange is not feasible, sell Zone 3 lands if they meet FLPMA Section 203 disposal criteria; and acquire legal access to inaccessible public lands in Zone 1 and 2 (see Glossary for definition of land ownership zones).

Alternative 1 would exchange or sell land in the La Pine core area; and exchange, transfer or sell public land near Bend, Redmond and Prineville to local governments as needed to accommodate community expansion and other public purposes (see B/LP RMP for specific criteria used in selection).

Public Health and Safety

Firearm Discharge

The B/LP RMP does not address the issue of firearms within the planning area. It does acknowledge that hunting "occurs throughout the planning area." Subsequent Federal Register firearm closures have been established to protect wildlife resources and other natural and cultural features, reduce vandalism, and improve public safety. These closures include a raptor closure at Awbrey Falls, and a raptor/high use closure in the Middle Deschutes Wild and Scenic River.

In addition, wildlife management related to campfires is briefly addressed in the Public Health and Safety section, although most of the wildland fire management discussion can be found in the Vegetation section.

Campfires

Pursuant to 43 CFR 9212.2 (a), "To prevent wildfire or facilitate its suppression, an authorized officer may issue fire prevention orders that close entry to, or restrict uses of, designated public land," the following sections of river would be closed to campfires seasonally, from June 1 to October 15:

1. Within ½ mile of the River's edge along the Lower Crooked River from the Highway 97 bridge to Lake Billy Chinook,
2. Within ½ mile of the River's edge along the Middle Deschutes River from Highway 20 bridge to Lake Billy Chinook,

If determined necessary, the fire closures could be extended based on existing conditions.

Archaeology

Alternative 1 would conduct cultural resource site monitoring, and complete cultural resource surveys in all project areas where ground disturbance would occur. Sites encountered during surveys would be protected from the effects of project undertakings, evaluated for their eligibility to the National Register of Historic Places and managed for their resource values (see B/LP RMP page 126 for specific guidelines for cultural resources).

Management Direction Common to Alternatives 2—7

Some changes to the current management would be adopted in Alternatives 2 – 7.

Ecosystem Health and Diversity

Vegetation

Ecosystem Maintenance and Restoration
Alternatives 2 – 7 would emphasize maintaining and restoring healthy, diverse and productive native plant communities appropriate to local site conditions. These alternatives would identify opportunities to actively re-pattern vegetation on the landscape to conditions more consistent with landform, climate, biological, and physical components of the ecosystem. Vegetation structure, density, species composition, patch size, pattern, and distribution would be managed to reduce the occurrence of uncharacteristically large and severe disturbances. Actions would maintain or mimic natural disturbance regimes so that plant communities would be resilient to periodic outbreaks of insects, disease and wildfire (see Appendix XX: Best Management Practices).

Special Status Plants
Alternatives 2 – 7 would manage special status plant species so that BLM actions do not contribute to the need to federally list them as threatened or endangered.

Shrub-Steppe Communities and Old-Growth Juniper Woodlands
Alternatives 2 – 7 would emphasize maintaining and restoring large contiguous stands of healthy, productive and diverse native shrub-steppe plant communities through active use of prescribed fire and mechanical treatments.

Under these alternatives, the health and integrity of old-growth juniper woodlands/ savannah would be protected and restored through a broad scale conservation approach. Activities would consider the importance of old growth juniper in mapped range.

Late and Old Structure Ponderosa and Lodgepole Pine
Alternatives 2 – 7 would provide direction to maintain and promote old forest structure and conditions through active treatments and restoration activities. Existing and developing old forests would be protected from ground-disturbing development and land use actions, and from uncharacteristically severe natural disturbances (i.e. stand-replacing wildfire, and insect and disease epidemics). Actions would be designed to develop and maintain stand structures that are relatively complex with highly variable tree densities, healthy and diverse understory composition, and abundant snags and downed logs.

Ecosystem Condition and Assessment
Alternatives 2 – 7 would include management direction to obtain and efficiently display information to help integrate analyses at all levels ranging from broad-scale assessments to site-specific projects.

Wildlife

Alternatives 2 – 7 would emphasize actions or conditions of use to promote conservation of listed species and the ecosystems on which they depend. Management for wildlife values would be emphasized less in WUI areas to reduce the potential for extreme wildfire potential in the wildland urban interface zones.

These alternatives would all incorporate existing and future potential relevant landscape features near Prineville Reservoir and Grizzly Mountain into a conservation strategy. Management techniques, such as altering or removing trees and shrubs, prescribed and managed wildland fire, livestock grazing, and planting may be used to maintain or improve habitat conditions.

Common to Alternatives 2 – 7 would also emphasize protecting and restoring special habitat components or features that contribute to the productivity of species. These features include, but are not limited to caves, cliffs, playas, riparian areas and wetlands, foraging areas, and snags and downed wood. These alternatives would provide direction to maintain and/or recruit adequate numbers, species and sizes of snags and levels of downed wood to contribute meaningfully to the needs of wildlife, invertebrates, fungi, bryophytes, saprophytes, lichens, other organisms, long-term soil productivity, nutrient cycling, carbon cycles and other ecosystem processes (see also Vegetation, Ecosystem Maintenance and Restoration).

Suitable special habitat components would be provided across the planning area (see also Vegetation), and could be maintained or improved using a variety of techniques, such as mowing of shrubs, prescribed burning, livestock grazing and/timber harvests. Rock quarries could be developed on cliffs or talus slopes not occupied by special status species.

Common to Alternatives 2 – 7 would be management direction to respond to the need to determine the distributions, abundance, reasons for current status, habitat, and management needs of Special Status Species occurring on BLM lands, and evaluate the significance of these lands and BLM actions for the conservation of these species.

Common to Alternatives 2 - 7 would be management direction to emphasize maintaining and supporting healthy, productive and diverse populations and communities of native plants and animals (including species of local importance) appropriate to soil, climate and landform. Where consistent with habitat capabilities, this agency would help meet ODFW management objective numbers for pronghorn, deer and elk.

Common to Alternatives 2 - 7, all new fences would be built to standard Bureau wildlife specifications to allow wildlife passage and existing fences would be modified as appropriate (B/LP RMP, p. 97), with the exception of fences built specifically to keep ungulates out of an area.

Sage Grouse
Where appropriate, actions would be consistent with the Greater Sage Grouse and Sagebrush-Steppe Ecosystems Management Guidelines as directed in IB No. OR-2000-334. These guidelines would be adopted as interim guidance until a new management strategy is developed and adopted. This management strategy is to be implemented in concert with the process established in BLM's "Standards for Rangeland Health and Guidelines for Livestock Management for Public Lands in Oregon and Washington" and other applicable laws, regulations, and policies.

Townsend's Big-Eared Bats

In addition to management direction Common to All Alternatives for caves with known Townsend's big-eared bat suitable habitat, management direction Common to Alternatives 2 - 7 would be to provide suitable habitat for the restoration of bat populations (including Townsend's big-eared bats) in a portion of the lava tube system known as Redmond Caves. Human uses may be excluded from some portion of the system (see also Special Management Areas).

Hydrology

Riparian
Common to Alternatives 2 – 7 would provide direction to maintain, protect, and/or restore aquatic and riparian-dependent terrestrial resources. Riparian Conservation Areas (RCAs) are intended to: maintain and restore riparian structures and functions; benefit fish and riparian-dependent resources; enhance conservation of organisms that depend on the transition zone between upslope and the stream; and improve connectivity of travel and dispersal corridors for terrestrial animals and plants, and aquatic organisms. These alternatives would have management direction to restore, maintain, or improve riparian vegetation and habitat diversity to achieve healthy and productive riparian areas and wetlands and to support populations of well-distributed native and desired nonnative plant, vertebrate, and invertebrate populations.

Water Quality
Common to Alternatives 2 – 7 would provide management direction to ensure that surface water and ground water influenced by BLM activities comply with or are making progress toward achieving State of Oregon water quality standards for beneficial uses as established per stream by the Oregon Department of Environmental Quality (ODEQ). Where water quality exceeds the water quality standards, water quality would not degrade to the point where it impacts beneficial use. This would be achieved through improved riparian vegetation, stream shade, and stream channel function.

For streams with water quality limited segments identified by the State of Oregon, uses and activities would be allowed in watersheds only if they would have no adverse effects on restoring water quality to required State water quality standards while protecting and enhancing natural values. Public use would be allowed along streams and around other water bodies, as long as State water quality standards are either attained at the same or greater rate than if the use or activity were absent or maintained. Management would be adjusted as needed for those uses and activities that are not leading to the attainment of state water quality standards. For streams with water quality limited segments (impaired waters) as defined by section 303(d) of the CWA, management activities would be implemented with the intent to restore water quality to levels that meet state water quality standards. As outlined in the Memorandum of Understanding between the BLM and DEQ,the BLM will comply with the Federal CWA and the State DEQ's program by employing the joint USFS and BLM protocol for addressing CWA section 303(d) listed waters. One goal of the strategy is to address all waters on BLM-administered lands generally within the timeline established by the State of Oregon DEQ. The BLM will take actions relative to 303(d) listed waterbodies in accordance with the protocol as outline in Appendix C (Protocol for 303(d) listed streams).

Watershed/Hydrologic Function
Common to Alternatives 2 – 7 would, where the capability exists, restore, maintain and improve upland and hydrologic function through the reduction of overland flow, increased infiltration, and improved floodplain function. Within the Broad Scale High Restoration Priority Sub-basins as identified on the Vegetation map (Map 4) that are not already verified, these alternatives would determine actual restoration needs prior to any large scale site disturbing activities that could affect hydrologic function. Existing

habitats that support the strongest populations of wide-ranging aquatic species would be secured. "Securing" can mean either reducing threats within the subwatershed or reducing threats in adjacent subwatersheds that would prevent achievement of subwatershed objectives.

Fire/Fuels Management

Common to Alternatives 2 – 7 would provide an appropriate management response on all wildland fires, with emphasis on firefighter and public safety. When assigning priorities, decisions would be based on relative values to be protected commensurate with fire management costs.

Burned areas would be rehabilitated to mitigate the adverse effects of wildland fire on soil and vegetation in a cost-effective manner and to minimize the possibility of wildland fire recurrence or invasion of weeds.

These alternatives would also provide management direction to restore and maintain ecosystems consistent with land uses and historic fire regimes through wildland fire use, prescribed fire, and other methods, as well as reduce areas of high fuel loading resulting from years of fire suppression that may contribute to extreme fire behavior.

In the wildland urban interface, the management of live and dead vegetation to provide for human safety in the event of a wildland fire under hot, dry summer weather conditions would be the top management priority. Treatments would be designed to allow for manageable low flame lengths, while still considering recreation opportunities, wildlife habitat and corridors, visual quality, air and water quality, and public access issues.

Air Quality

No actions taken by BLM in implementation of the Upper Deschutes RMP Revision will engage in, support, provide financial assistance for, license or permit or approve any activity that does not conform to the Oregon Smoke Management Plan, a companion to the Oregon State Implementation Plan.

Alternatives 2 – 7 include common guidance to meet the national ambient air quality standards (NAAQS) as described in the CAA (Clean Air Act).

Special Management Areas

Special Management Areas within the Upper Deschutes RMP boundary include Areas of Critical Environmental Concern (ACECs), Research Natural Areas (RNAs), Wilderness Study Areas (WSAs), Wild and Scenic Rivers (W&SR), and Caves.

Common to Alternative 2 – 7 would be management direction to eliminate a section of the Wagon Roads ACEC, and add an ACEC designation to two sections of other historic roads and a portion of the historic Tumalo irrigation canals[16]. The Lower Crooked River ACEC would also be dropped from that designation. About 2600 acres would be eliminated from ACEC designation, and about 1800 acres added common to Alternatives 2 - 7.

There would be common direction for new uses within ACECs to be evaluated for consistency with ACEC values. The designation could result in future limitations

[16] Note that the Tumalo Canals is incorporated into other proposed ACECs in Alternatives 3 and 4, and stands alone in Alternatives 2, 5, 6, and 7, but guidance for the area remains the same.

on location, extent, or intensity of use or include stipulations to avoid, reduce, or compensate for effects to values. The degree to which other uses might be affected would depend upon the potential effects of a site-specific proposal on the specific ACEC values. Some specific prohibitions on uses are included in the designations for specific ACECs. Common guidance includes limitations on removal of vegetation or rockhounding, disposal of property, or issuing patent-based R&PP leases. The Wagon Road and Tumalo ACECs would be managed with an emphasis on interpretation of the historic resources, would limit motorized and military activities within portions of the ACECs and close all or portions of the areas to uses that are likely to adversely affect those resources. Common to Alternatives 2 - 7 would be an emphasis on establishing locatable boundaries for Wilderness Study Areas, and to specify closures to activities that could concentrate or leave evidence of human uses.

Cave resources within the planning area would receive common guidance to protect the basic integrity of the system and potential cave biota if they have not been determined to be significant caves under the Federal Cave Resources Protection Act. Those that have been nominated or determined to be significant under the Federal Caves Resources Protection Act would have common general guidance for promoting cave integrity and conditions under which human uses would be allowed, including closing caves to specific activities that are likely to have an adverse effect on cave resources. Additional specific guidance would be provided for Redmond and Pictograph caves.

ACECs

One addition to an existing ACEC, Historic Roads, would be designated, and one existing ACEC, Lower Crooked River, would be removed from ACEC designation. The objectives and guidelines identified in this section apply to all of the "action" Alternatives (2 – 7).

In general, for all ACECs, adjustments out of federal ownership would not occur. Harvest of special forest and range products would not be allowed, except in conjunction with restoration treatments and/or consistent with the values of the ACEC. In addition, R & PP leases would not be issued for lands within ACECs unless such leases would be non-patent leases and would not impair the values for which the ACEC was designated.

Tumalo Canals ACEC

Mineral material sales would not be allowed in the south ½ of sections 29 and 30 and the north ½ of Sections 31 and 32, T 15 S., R. 12 E., to protect the Tumalo Canals area. Surface occupancy for fluid mineral leasing would not be allowed. Approved plans of operation would have stipulations to protect the values of this ACEC. An area adjacent to and east of Barr Road would be closed to prescribed fire, mountain biking, horseback riding, livestock grazing, rockhounding, OHV use, target shooting, dispersed camping and managed specifically for interpretive use. This area would be defined by signs, fencing, or other means.

Wagon Roads ACEC

Alternatives 2 - 7 would protect and maintain the segments of the historic Horner, Huntington and Bend-Prineville roads designated as an ACEC.

Alternatives 2 - 7 would add[17] approximately six miles of historic Horner Road and approximately 5 miles of the historic Bend-Prineville Road to the existing Wagon Roads ACEC. The ACEC would constitute approximately 986 linear acres, including a 300-

[17]The additional segments of the Wagon Roads ACEC in Alternatives 2-7 receive the same management guidelines applied to the ACEC in the Common to All section.

foot distance on either side of the road segments to protect associated historic features (see Map 7). The central and northern segments of the Wagon Roads ACEC located in Township 16, Range 13, Section 21 and Township 15, Range 13, Section 33, respectively (see Map 7), would be removed from ACEC designation.

No new roads or rights-of-ways would be allowed within the ACEC. The ACEC would be closed to the use of paintball guns. In addition to the restrictions noted, firearm discharge, overnight camping, and geocaching[18] activities south of McGrath Road (i.e., surrounding the segment of Huntington Road in Section 1) would not be allowed. No competitive events would be allowed except at designated trail or road crossing points. Tracked military vehicles would not be allowed on the historic roads. Locations where tracked vehicles would cross the historic roads have been, or would be in the future, determined in consultation with the Oregon Military Department. Vegetation and wildlife habitat management would not be allowed unless such projects maintained and enhanced the special values of the ACEC. An area one mile of either side of the roads for which this ACEC is designated would be closed to mineral material sales and surface occupancy for fluid mineral leasing. Geophysical exploration would be restricted to protect the special values of this ACEC. Plans of operation would be submitted by prospective applicants and approved by the BLM prior to any development of mining claims. Approved plans of operation would have stipulations to protect the values of this ACEC. The collection of any rock materials would not be allowed.

Livestock grazing and associated developments would be allowed so long as livestock do not concentrate in the ACEC and developments do not affect the resources for which the ACEC was designated. Opportunities for the designation of a pedestrian trail system with interpretive signage would be pursued. OHV use would be allowed on designated trails within the 300-foot area on either side of each road (except the southernmost segment), to the extent necessary to create safe and maintainable trail crossings. OHV trails that parallel the historic roads would be located beyond 300 feet from each side of the road to the maximum extent feasible. Special Recreation Permits (SRPs) would be issued for foot traffic events/group use only on the road segments.

Research Natural Areas

Within the Powell Butte RNA, livestock grazing would be prohibited, pending construction of a boundary fence. Horse Ridge and Powell Butte RNAs would be closed to motorized and mechanized use. No designated roads or trails would be identified, and special recreation permits would not be authorized. Camping would not be allowed. The RNAs would be closed to activities that concentrate use in certain areas, such as geocaching. Vegetation and wildlife habitat management project work would be allowed if specified in a natural area management plan for the RNA. Collection or sale of vegetative materials would not be allowed. Research and educational activities would be encouraged. In addition, Horse Ridge ACEC/RNA is managed under IMP for lands under wilderness review, which may place additional management restrictions.

Wilderness Study Areas

Wilderness Study Areas would be managed to maintain wilderness suitability, consistent with the "Interim Management Policy for Lands under Wilderness Review" (1995). In Alternatives 2 – 7, the WSAs would be Closed to paintball and geocaching use.

[18] For this plan, geocaching is defined as leaving any items on BLM administered lands for the purposes of posting or advertising the approximate location of those items for others to find.

Caves

As directed by the Federal Caves Resources Protection Act (1988), Alternatives 2 – 7 would emphasize managing caves nominated for significance or determined significant with an emphasis on education, research, and protection of cave resources and to manage activities and use to not impair the nominated values for which the cave may be determined significant.

Under Alternatives 2- 7, group use of caves would be allowed only under Special Recreation Permit authorizations. Group size would be limited to six to eight people at one time and no more than three tours per cave per day. Group use under permit must comply with seasonal restrictions and provisions of the FCRPA. Access to all Significant/Nominated Caves would be restricted to foot access only. For caves with designated parking areas, the agency would consider providing a visitor register to collect information on the visitors name, purpose, number in party, comments, and use patterns. Caves with high resource concerns and those with active volunteer or stewardship programs would be considered as priorities for visitor registers. In addition, for caves with designated parking areas, signs would be provided with cave information, cave etiquette and Leave No Trace ethics.

Mountain bike, horse, or motor vehicle use would not be allowed in caves. The possession and use of alcoholic beverages, as defined by state law, would be prohibited in all caves. Common to Alternatives 2 – 7 would prohibit the use of glass containers within caves to reduce litter and provide a safer environment for cave visitors. Significant/Nominated Caves would be closed to geocache use. The use and/or possession of chalk or visually apparent hand-drying agents would also be prohibited in Significant/Nominated Caves.

Redmond Caves
Alternatives 2 – 7 would manage the Redmond Caves parcel to protect and maintain the resources of Redmond Caves, including biologic, cultural, and geologic features, and would provide for recreational use that is consistent with management of these cave resources.

The 40-acre Redmond Caves parcel would be designated as Closed to public motorized and mechanized vehicles for management of cave resources. The Redmond Caves parcel would be closed to campfires, overnight use (except under permit), geocache use, paintball use, rockhounding and mineral material sales and surface occupancy for fluid mineral leasing.

Pictograph Cave
Alternatives 2 – 7 would manage Pictograph (Stout) Cave to protect scientific values and cave resources (including habitat for bats), and to meet the requirements of the FCRPA. Recreation management would be oriented toward interpretive and educational opportunities.

Land Uses

Livestock Grazing

Common to Alternatives 2 - 7 would be direction for continued livestock grazing, while reducing conflicts with and meeting needs of other uses and resources.

Definitions of urban and rural for Livestock Grazing
In Alternatives 5 and 6, in the livestock grazing section, the following definitions of urban and rural are used: Urban includes all of La Pine, and those areas north of a line running

east out of Bend on Highway 20, then up Dodds Road to Alfalfa, north on Johnson Ranch Rd, then east along the mid-slope of the Powell Buttes, around to Millican Rd, south along State Route 20, then east at Prineville Reservoir. Rural is all other areas.

Estimating Potential for Conflict and Demand

In Common to Alternatives 2 - 7, the BLM would use a formula to estimate potential for "conflict" and "demand" to help identify where problems are likely to occur. These estimates would be used to prioritize work. The BLM would also set maximum allowable conflict and demand thresholds, and take actions as necessary to keep management costs and conflicts below those thresholds. The maximum allowable conflict/demand levels vary by alternative, and are displayed in Table 2-11 (for Alternatives 2-6, below), and in Table 2-71 (for Alternative 7). Information regarding outcome for specific allotments is provided in Appendix G.

A model or formula is used in Common to Alternatives 2 - 7 to help estimate which allotments have the highest potential for problems, or conflicts. Potential conflicts are classified as low, moderate or high (described below). The BLM would then use these estimates to help make decisions about where livestock grazing should continue, and where conflicts might be high enough to warrant modifying or discontinuing grazing now or in the future.

The formula for Alternative 7 is modified from that used for Alternatives 2-6 by the addition of an "ecological conflict" factor. Existing management direction already provides a process for responding to ecological concerns, but this addition would provide decision-makers with a way to consider social, economic, and ecological factors. There are also some minor changes to how social and economic conflict are estimated, including dropping some criteria, adding others, and "weighting" the equation so that some criteria counted for more than others.

Estimating potential for human/livestock conflicts

In Alternatives 2-6, the potential for conflict is estimated using three factors: 1) Residential or resort zoning, 2) Busy roads (paved and/or 45mph+), and 3) Closed range (within a livestock district). Conflict is considered "high" when two or three of the factors listed above exist within ¼ mile, *or* where two exist within ¼ mile and the third within ½ mile. "Moderate" conflict is where all of the above factors exist within ½ mile, or where one exists more than ½ mile away but the other two are within ¼ mile, or one of them is within ¼ and the other is within ½. All other areas are considered "low" conflict.

Table 2-11: Grazing decision-making matrix for Common to Alternatives 2-7

		Conflict Level		
		Low	**Moderate**	**High**
Demand Level	**Low**	Open[1] in Alts 2, 3 Closed[2] in Alts 4, 5, 6	Open in Alts 2 & 3 Closed in Alts 4, 5 & 6	Open in Alts 2, 3 Closed in Alts 4, 5, 6
	Moderate	Open in Alts 2, 3, 4 Closed in Alts 5, 6	Open in Alts 2, 3, 4 Closed in Alts 5, 6	Open in Alts 2, 3 Closed in Alts 4, 5, 6
	High	Open in all Alternatives	Open in Alts 2, 3, 4, 6 Closed in Alt 5	Open in Alts 2, 3, 6 Closed in Alt 4, 5

[1]All "Open" allotments are still subject to grazing modification as necessary to reduce conflicts with other uses of public land, to achieve Standards for Rangeland Health, and to meet other goals, objectives, and management direction listed in the Common To All section.
[2]In "Closed" allotments, livestock grazing would be discontinued for the life of the plan. The closures would be temporary, subject to review and change during the next planning cycle. Affected permittees would receive 2-year notification unless they waive that right, and they would be compensated for their financial interest in range developments (based on their contribution to the project, minus depreciation). Displaced permittees in good standing would receive priority for permits in vacated allotment and un-allocated AUMs in other allotments.

In Alternative 7, potential for conflict is estimated using three factors: 1) Miles of residential or resort zoning along allotment boundary, 2) amount of recreational use, and 3) percent of allotment within a special management area (e.g., WSA) that was designated at least in part for "social" values (e.g., visuals, solitude). Factor 1 (zoning) was converted to miles/AUM, with the highest scoring allotment set at 100, and scaled down to zero from there. Factor 2 (recreation) is scored as 75 if the Allotment Categorization Form classified it as "M" on the recreation criteria on that form, and 100 if "H." For factor 3, the highest scoring allotment is set at 100, and scaled down to zero. If there were only a few scores at the high end for one of the factors, the raw score was multiplied so the scores for the factor were more evenly spread between 0 and 100 (aiming for about 1/3 falling above 67, at the "high" end). This was necessary to make the criteria sensitive enough to register differences between allotments. The factors making up the total social conflict score are weighted equally (each represents 33 percent of the total score).

Estimating potential for demand

In Alternatives 2-6, potential for demand was estimated using two factors: 1) Cost of new fences to enclose private land in closed range, or reconstruct allotment boundaries, and 2) Cost to patrol for cut fences, open gates. These two costs are defined below. Demand for an allotment is defined as low when 1) plus 2) is divided by the number of AUMs in the allotment, and the total is less than 2; moderate is when the score is between 2 and 10; and high when the score is over 10.

Fence maintenance and new fence needs are estimated and would need site visit and permittee input to get a more exact number.

Cost for new fence is assumed to be $4,000/mile, divided by 10 years since it is not a cost that must be paid annually.

Patrol costs are assumed to be $10/mile/week in areas of moderate patrol needs (definition follows), and $15/mile/week in areas of high patrol needs, multiplied by the number of weeks the allotment is grazed, and divided by the number of pastures in the allotment. High patrol needs fences are those fences in or within ¼ mile of closed range *and* within ¼ mile of one of a busy road or residential zoning. Moderate patrol needs fences are those within ¼ mile of any one of the following: closed range, residential zoning, busy road; *or*, fences along private land boundary where Criteria 3 on Allotment Categorization Form is I (indicating high recreational use of the area) *and* not meeting the above "high patrol" criteria.

In Alternative 7, potential for demand was estimated using eight factors: 1) Waiting list for permit for allotment, 2) miles of residential or resort zoning along allotment boundary (this factor and factors #3 were calculated the same here as they were under social conflict), 3) amount of recreational use (calculated as above), 4) costs to install required new and maintain existing fence (assuming $50/mi maintenance and $4,000/mi new), 5) percent of allotment needing water hauled to troughs, 6) amount of seasonal restrictions on grazing (one season only = 100, two = 50, three = 25, year-round permit = 0, unknown = 50), 7) relative amount of forage (AUMs) in allotment, 8) percent of allotment containing important deer, grouse, and elk habitats. As with the conflict criterion, the high score for each factor is 100, with an even spread of scores between 0 and 100. Factors are weighted as follows: #1 is 20 percent of the total demand score, #2, #3, #4, #5, #7 are each 12 percent, and #6 and #8 are each 10 percent. Waiting list is based on professional judgment (12 years at Prineville District BLM as a Rangeland Management Specialist). The District has not kept a separate list for each allotment in the past.

Estimating potential for ecological conflict

This criterion was only used in Alternative 7. Potential ecological conflict is estimated using the following factors: 1) percent of the allotment failing to meet Standards for Rangeland Health (100 if entire allotment fails and livestock are a causal factor, 0 if

meeting standards or if rangeland health assessment has not been completed); 2) percent of allotment containing important deer, grouse, and elk habitats; 3) percent of allotment within a special management area (e.g., WSA) that was designated at least in part for "ecological" values (e.g., Pecks milkvetch). Scores were topped at 100 for each factor, and adjusted for an even spread between 0 and 100. The factors are weighted as follows: #1 makes up 40 percent of the total ecological conflict score, #2 and #3 are each 30 percent. The rangeland health assessments for allotments #5204, 5205, 5207 and 5209 are nearly completed, and the Alternative 7 column in Appendix G assumes that the preliminary indications remain true, and that the assessments would be finalized in the next few months.

General Guidance
Prescribed livestock grazing would be allowed to control weeds, reduce fire danger, or accomplish other management objectives, regardless of parcel status (including vacant allotments, areas of discontinued grazing, or Reserve Forage Allotment as described in Alternative 7).

Livestock would be excluded from Mayfield Pond after establishing livestock water source(s) at alternate locations in the allotment. Livestock grazing would also be discontinued in the fenced portion of the Tumalo Canals (see also Special Management Areas).

ACEC Guidance
In ACECs designated for Peck's milkvetch (the designated area boundary changes by alternative), grazing would be deferred until after mid-August at least every other year unless evidence shows other grazing systems are compatible with the objectives for which the area is designated.

Disturbance Events
After a disturbance event (examples below) which results in undesirable soil or plant conditions, livestock grazing would typically not be permitted (see exceptions, below) the remainder of the calendar year, and through the growing season of the next year.

Exceptions would be for cases where such grazing would either not impede site recovery, or where livestock are used as a tool to aid in achieving certain recovery objectives (such as cheatgrass control).

Livestock grazing would resume after an interdisciplinary team visits the site and documents that soil and vegetation have recovered sufficiently from the initial disturbance to support livestock grazing. Disturbance events would include natural and human-induced events including but not limited to wildfire, prescribed burns, timber management treatments, juniper cuts, and rehabilitation seedings.

If a disturbance event does not result in undesirable soil or vegetative conditions, livestock grazing need not be excluded from the pasture. One example of a disturbance not requiring livestock exclusion is an herbicide treatments or juniper cut in an area that has previously been found to meet the Standards for Rangeland Health, and that appears to still meet these standards after the disturbance.

Livestock exclusion after disturbance events would also not be required if livestock would not be trailed through the affected area, and attractants (e.g., water, supplemental feed, salt) are not provided within one mile. Attractants could be closer than one mile if physical barriers (e.g., rimrock, fences) would prevent livestock access to the affected area.

Prescribed or permitted livestock grazing could occur any time after disturbances in pastures containing affected areas if an interdisciplinary team designs and monitors

the grazing to accomplish resource objectives (e.g. to control noxious weeds, or assist in getting broadcast seeds worked into the soil).

Minerals

Mineral Material Sales
Common to Alternatives 2 – 7 would meet the increasing demand for mineral materials while reducing mining conflicts with recreation, residents, natural resources and other management objectives. Common to Alternatives 2 - 7 would be guidance for establishing conflict-demand thresholds at one of three levels (low, moderate, or high) based on potential conflicts with residents, recreational users, and relative importance of the material site. Threshold for the levels of conflict and mineral material importance are outlined in Table 2-12 – Mineral Importance and Conflict Thresholds.

Public lands not withdrawn from mineral entry or under discretionary closure may be explored and/or developed for saleable mineral material and fluid mineral resources where conflicts with recreation, residents and natural resources do not exist or can be

Table 2-12 : Mineral Conflict and Importance Thresholds

Category	Low	Moderate	High
Potential Recreation Conflict Level	Mineral material sites/ roads must be at least ½ mile from designated recreation sites where conflicts with recreation exist*; mining access roads may not cross trails.	Mineral material sites/ roads must be at least ¼ mile from designated recreation sites where conflicts with recreation exist*; mining access roads may cross trails.	Mineral material sites/ roads must be at least 1/8 mile from designated recreation sites where conflicts with recreation exist*; mining access roads may cross trails.
Potential Residential Conflict level	Mineral material sites/ roads must be at least ½ mile from residentially zoned areas. Roads that feed from BLM-administered lands into residentially zoned areas may not be used for mining-related traffic.	Mineral material sites/ roads must be at least ¼ mile from residentially zoned areas. Roads that feed from BLM-administered lands into residentially zoned areas may not be used for mining-related traffic.	Mineral material sites/ roads must be at least 1/8 mile from residentially zoned areas. Roads that feed from BLM-administered land into residentially zoned areas may be used for mining-related traffic only if alternate routes are not available.
Potential Habitat Component Conflict Level	See Wildlife Emphasis Table for Primary Emphasis, and refer to allocations and guidelines under CTA and CT 2 - 7	See Wildlife Emphasis Table for Secondary Emphasis, and refer to allocations and guidelines under CTA and CT 2 - 7	See Wildlife Emphasis Table for Minor Emphasis, and refer to allocations and guidelines under CTA and CT 2 - 7
Potential Importance of Mineral Material Deposit	Alternative** sources are available		Alternative** sources are not available.

*Designated recreation sites that depend upon or exist in mineral material pits generally will not be considered to be in conflict with mining operations for the purposes of setting up a buffer zone.
**To be considered an alternative source, a mineral material site must be available within 30 miles driving distance of the construction site(s) where the mineral materials would be utilized or the commercial distribution center(s) where the mineral materials would be privately sold as raw materials or as finished products. In addition, an alternative source must not require travel through more than one population center including and limited to Bend, Prineville, Redmond, and Sisters. Alternative site(s) can be eliminated from consideration if the quality of material from the source(s) is demonstrably unacceptable.

mitigated. Development of valid mining claims must include measures to mitigate conflicts with recreation and residents in notices and plans of operation where such conflicts exist. Mineral material sales would not be allowed within 1/8 mile of residentially zoned areas or designated recreation sites.

Common to Alternatives 2 - 7, mineral material sites with ½ mile of developed recreation sites and residentially zoned areas, mineral extraction, processing, and equipment operation would be allowed between 7:00 a.m. and 6:00 p.m. Monday through Friday; and for sites located farther than ½ mile from developed recreation sites and residentially zoned areas, those activities would be allowed between 7:00 a.m. and 10:00 p.m. Monday through Friday. No operations would take place at mineral material sites on weekends or certain legal holidays. Blasting would be allowed for mineral material sites within one mile of developed recreation sites, residential areas, and agricultural use sites involving the raising of animals between 9:00 a.m. and 5:00 p.m. Monday through Friday; and the operator must provide written notification to land owners and inhabitants within one mile at least 48 hours prior to the time blasting starts. For extended blasting operations, such notification must be given at least once each month. No blasting at mineral material sites is allowed on weekends or any of the legal holidays (see Appendix A for complete details on surface mining restrictions).

Exceptions to restrictions on mineral material site operations may be granted if conflicts with residents, recreational uses, and other management objectives can be mitigated. Exceptions may also be made for administrative purposes.

Alternatives 2 – 7 would also provide recreational rockhounding opportunities while protecting other resource values. Rockhounding resources would be managed to provide long-term recreation opportunities while mitigating ground disturbances and discouraging illegal commercial activity and excessive personal use.

Rockhounding

In Common to Alternatives 2 - 7, the Reservoir Heights, Prineville Reservoir, and the portion of the Fischer Canyon site west of Highway 27 would no longer be managed as rockhounding sites. A new site, the Carey Agate Beds, would be designated as a rockhounding site.

On public lands open to rockhounding, the collection of rocks, semi-precious gemstones, and common invertebrate fossils would be allowed in reasonable amounts and for personal use only. "Reasonable amounts" are defined in this plan as 50 pounds per person per day and not to exceed 500 pounds per year. This limit would not include and is separate from the existing limit on petrified wood collection. Any commercial use would require a permit. All persons excavating, digging, or otherwise removing soil to explore for, discover or remove buried rock materials would be required to fill all holes prior to departure from the collecting site. No person would be allowed to create excavations or holes that undermine the root systems of trees, enter into the ground at a non-vertical angle so as to create a tunnel or overhang, or exceed a depth of four feet. In all riparian areas and stream channels including the channel banks, rockhounding activities shall be restricted to surface collection only. No person shall excavate, dig, or otherwise remove soil, sand, or gravel in stream channels to explore for, discover, or remove buried rock materials.

Future rockhounding management plan(s) may place different collection limits and regulations on specific sites.

Forest Products

In Alternatives 2 – 7, harvest of forest products would normally be associated with restoration and fuels treatments and would be designed to meet objectives for forest

health, fire hazard reduction, hazard tree removal, special status species management, visuals, recreation and travel management, and wildlife habitat management. The amount of forest products harvested would vary only slightly between alternatives. The location and priorities for harvest may change with the alternatives according to different vegetation management treatments implemented.

Raw material for a variety of forest products would be made available in all alternatives. Objectives for ecosystem and fuels management during the 15-year life of this plan would result in the production of primarily small diameter material, generally in the range of 4 to 12 inches DBH. This size of material could be suitable for production of products such as small sawlogs, house logs, posts and poles, chips, fuel biomass, firewood, and various specialty products.

It is anticipated that fuels reduction and forest restoration treatments would also produce a relatively high proportion of green material in the 4-8 inch DBH class. This size of tree has previously been considered "non-merchantable" and was typically disposed of by piling and burning. Due to fire hazard and smoke concerns within the priority wildland-urban interface treatments areas, most of this material would be removed off-site in all alternatives. An effort would be made to encourage the development of markets and other outlets that could utilize large quantities of this small size material. The on-site location of temporary portable chippers/grinders, portable biomass/energy production, and new types of specialized equipment for moving and processing this material could be authorized. To maintain site productivity (organic matter and nutrients), limit re-establishment of trees and brush, and discourage cross-country motorized travel, much of the fine materials not utilized (seedlings, saplings, tops, and branches less than 4 inches in diameter) would be left scattered on the forest floor where it would not contribute to ladder fuels.

Special forest and range products would be managed according to sustainability limits and where consistent with other resource management objectives. These products would be harvested by permit only and management would be guided by site-specific NEPA guidance and permit collection regulations (see Table 2-1: Comparison of Alternatives for forest product volumes produced under each alternative, and Appendix F: Best Management Practices).

Military Uses

Common to Alternatives 2 – 7 would provide management direction to ensure consistency with planned and approved activities with environmental requirements, integrated resource management plans, and conflict resolution with neighbors on public lands authorized for long-term and short-term military use. Common to Alternatives 2 - 7 would be the use of at least 20,000 acres adjacent to the BIAK training center for long-term military training use. Common to Alternatives 2 - 7 would also provide a reliable land base suitable for meeting short- and long-term resource management and nation and state readiness needs, and would provide areas sufficient to avoid continual use of the same training area.

Visual Resources

Common to Alternatives 2 – 7 would apply VRM classes that emphasize retention of high visual quality along high use travel routes, on prominent landforms that provide community backdrops, and at recreation destinations such as reservoirs and state parks. In addition, Common to Alternatives 2 – 7 would emphasize the following:

- Managing VRM Class 1 lands to preserve the existing character of the landscape. Where natural, ecological changes dominate, the level of change provided by

management actions should be very low and not attract attention. (see also Wilderness Study Area section)

- Managing VRM Class 2 lands for low levels of change to the characteristic landscape. In these areas, management activities may be seen but should not attract the attention of the casual observer. Changes should repeat the basic elements of form, line, color, texture, and scale found in the predominant natural features of the characteristic landscape.

- Managing VRM Class 3 lands for moderate levels of change to the characteristic landscape. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements of form, line, color, texture, and scale found in the predominant natural features of the characteristic landscape.

- Managing VRM Class 4 lands for moderate levels of change to the characteristic landscape. Management activities may dominate the view and be the major focus of viewer attention. Every attempt will be made to minimize the effect of management actions through careful location, minimal disturbance, and repeating the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Under Alternatives 2 - 7, all BLM administered lands in the planning area would be managed to meet the following Visual Resource Management Classes:

- VRM Class 1 areas – Preserve the existing character of landscapes (approximately 32,928 acres).

- VRM Class 2 areas – Retain the existing character of landscapes (approximately 37,590 acres).

- VRM Class 3 areas – Partially retain the existing character of the landscape (approximately 88,179 acres).

- VRM Class 4 areas – Allow major modifications of existing character of landscapes (approximately 246,163 acres).

- VRM Class 5 areas – Areas in need of rehabilitation from a visual resource standpoint (approximately 8 acres).

The Visual Resources Management Classification map (Map 22) shows the location of visual resource management classes. The following list identifies general areas that are included in each VRM Class in the UDRMP area:

VRM Class 1:
Badlands WSA
Steelhead Falls WSA
Horse Ridge ACEC/RNA/ISA

VRM Class 2:
Areas visible from Prineville Reservoir (foreground views)
Smith Rock block
Horse Ridge and Dry Canyon
Portions of West Butte area
Dry Canyon in Cline Buttes
Deschutes River corridor
Crooked River corridor

Ochoco Reservoir parcel
Cline Buttes slopes visible from the Redmond area
Wagon Roads ACEC
Powell Butte RNA
Redmond Caves parcel

VRM Class 3:
Skeleton Fire area
West Butte area
Areas visible from Prineville Reservoir (background views)
Smith Canyon area
Immediate foreground view of State Highway 20, 26, 27, 126, Powell Butte Highway, -Juniper Canyon Road, Reservoir Road, except where superceded by other VRM Class designations

VRM Class 4:
Covers most of the remainder of planning area

VRM Class 5:
Crooked River Canyon area north of Chimney Rock Wild and Scenic River segment

Recreation

Common to Alternatives 2 -7 would be to provide and maintain a wide range of recreation opportunities while meeting overlaying resource management objectives within the planning area and urban interface setting. The common objective is to increase the quality of recreation experiences by moving toward an overall designation of road and trail systems throughout the planning area, which, if implemented, would provide more user information, and a consistent set of opportunities that can be accessed by both local and out-of-area visitors. Additional recreation opportunities through new trail development are emphasized, both to increase diversity and to meet projected increases in recreation demand. Common to Alternatives 2 – 7 provides management direction to maintain a wide range of recreation opportunities that contribute to meeting projected recreation demand while meeting overlaying resource management objectives within the planning area and urban interface setting.

Common to Alternatives 2 – 7 would identify all lands within the planning area except those located north of Prineville as the BLM Central Oregon Special Recreation Management Area. The specific components of this SRMA are identified (See Special Recreation Management Areas Map 7) as:

- Badlands WSA
- Bend/Redmond Recreation Area
- Cline Butte Recreation Area
- Horse Ridge Recreation Area
- Northwest Recreation Area
- La Pine Recreation Area
- Mayfield Recreation Area
- Millican Plateau OHV Area

- North Millican OHV Area
- Prineville Reservoir Recreation Area
- Smith Rock Recreation Area
- Steamboat Rock Recreation Area
- South Millican OHV Area
- Steelhead Falls WSA
- Tumalo Recreation Area

Due to the scattered nature of the public land parcels surrounding and north of Prineville, this area was not identified as part of the SRMA.

All alternatives would have common objectives to manage off highway motorized vehicle and non-motorized vehicle use to provide visitor satisfaction, protect natural resources, provide visitor safety, and minimize conflicts among various users and neighbors. Non-motorized recreation opportunities would also be provided to offer visitor satisfaction, protect natural resources, and minimize conflicts among users and neighbors. Designated access points, which include entry points, and parking areas, trailheads, and staging areas would be designated and managed to enhance visitor experience, protect resources, and minimize conflicts with neighboring land owners.

Common to Alternatives 2 - 7 and Common to All Alternatives would be designations of BLM managed lands within the planning area as Open, Limited, or Closed for the operation of off highway vehicles. Each alternative varies in the amount and distribution of these various travel management designations throughout the planning area. The location and distribution of these travel management designations reflect the overall themes of each alternative. The following criteria are used, along with other resource objectives and goals, in designating travel management objectives for different areas.

- **Open-CTA**
  Designate sites managed for intensive and highly managed use (where significant resource or social conflict issues are not expected) as Open. As defined in the BLM's National OHV Strategy (2000), the "BLM designates areas as 'open' for intensive Off-Road Vehicle (ORV) use where there are no compelling resource protection needs, user conflicts, or public safety issues to warrant limiting cross-county travel."

- **Limited**
  Designate areas where motorized public access is managed to meet specific recreation and resource management objectives as Limited. As defined in the BLM's National OHV Strategy, the agency designates areas as "limited" where it must restrict motorized OHV use in order to meet specific resource management objectives. These limitations may include:
  1. Restricting the types of vehicles uses in an area
  2. Restricting motorized vehicles to designated roads and/or trails
  3. Limiting the season or time of use.

- **Closed**
  Designate areas where motorized use should be restricted to protect resources, ensure visitor safety, or reduce conflicts as Closed. Areas are closed to motor vehicle use where recreation management emphasis is on providing non-motorized recreation.

Appropriate recreational opportunities would also be provided, while reducing conflicts between recreational users, and between recreational users and adjacent landowners; in addition:
To protect and maintain ACEC/RNA values, the Powell Butte ACEC/RNA and the Horse Ridge ACEC/RNA will be closed to camping/overnight use;
To ensure recreational settings remain as interpretive sites and to reduce effects on cultural resources, The Wagon Roads ACEC and Tumalo Canals ACEC will be closed to camping/overnight use;
To reduce conflicts with neighboring landowners and provide a day use recreation setting in predominantly urban settings, the following would be closed to overnight use:
Parcel north of State Highway 126 and west of the North Unit Canal;
Redmond Caves parcel;
BLM parcel north of Highway 126 and adjacent to Cline Falls State Park;
40-acre parcel on State Highway 97 south of Deschutes Junction;
All designated parking areas, staging areas, and trailheads unless specifically authorized and posted;
Sisters Bouldering Area.

Interim Road and Trail Designations:
Common to Alternatives 2 – 7, until completion of site-specific identification of local road or trail designations, an interim system of local roads and trails would be designated in each geographic subdivision.

In all areas, construction, placement or maintenance of roads or trails without authorization, contract, or approved operating plan would be prohibited.

Group Use/Special Recreation Permits
These alternatives would also provide for projects, programs, and permits that promote a diverse range of recreation opportunities, as well as provide for individual, group, and competitive event recreational use that could not be reasonably accommodated on private land (See Appendix A for a complete description of special recreation permits, group use and commercial use).

Wilderness Study Areas

No motorized group use, competitive use, or vending would be allowed in the Wilderness Study Areas, and SRPs would be required for all organized group activities involving greater than 12 participants (see Appendix A for additional requirements for SRPs in WSAs).

Geographic Areas

Allowable uses, allocations and guidelines, which generally vary according to alternative, apply to specific portions of the planning area. Common to Alternatives 2 - 7, the geographic subdivisions would be managed to meet one or more of the following objectives:

- Off highway motorized vehicle use would be managed to provide visitor satisfaction, protect natural resources, provide visitor safety, and minimize conflicts among various users and neighbors.

- Non-motorized recreation opportunities would also be provided to offer visitor satisfaction, protect natural resources, and minimize conflicts among users and neighbors.

- Designated access points, which include entry points, parking areas, trailheads, and staging areas, would be added to enhance visitor experience, protect resources, and minimize conflicts with neighboring land owners.

- Developed or urban based recreation opportunities would be provided, while minimizing duplication of services among agencies.

- Recreation projects and programs that promote recreation management objectives and support community economic strategies would be provided.

- Competitive and group events would be provided for when that use could not be reasonably accommodated on private land.

- Provide recreation projects and programs that promote recreation management objectives and support community economic strategies would be provided.

Bend/Redmond
The main block located between State Highway 126 and Powell Butte Highway would be designated as Limited to designated roads and trails; open year-round (see Map 9). Highway 97 parcel would be designated as Closed to motor vehicles. The 1,360 acre area surrounding the southern portion of the Wagon Roads ACEC would be designated Closed to motor vehicles.

Cline Buttes
The main block (the area between Cline Falls Highway and Fryrear Road) would be Limited to designated roads and trails. The following parcels would be designated as Closed to motorized vehicles:

- Harper Road Parcel

- Youngs Avenue Parcel

- All portions of the Cline Buttes block located east of the Deschutes River, including the Jaguar Road parcel

- BLM Parcel adjacent to Cline Falls State Park

- The Tumalo Canal ACEC east of Barr Road

Horse Ridge
The following areas would be Closed to motor vehicle use:

- Small parcels surrounding Conestoga Hills Estates.

- The BLM managed lands bounded by State Highway 20 on the east, Rickard Road on the south, and private lands to the west and north.

- Horse Ridge ACEC/RNA.

The Skeleton Fire area between the Deschutes National Forest boundary, Old Highway 20, the private lands at Gosney Road, and Horse Ridge would be managed for motorized use on designated roads only.

La Pine
Motor vehicle travel would be Limited to a designated system throughout the majority of the area. Approximately 10 small, isolated parcels (generally 40 to 320 acres in size) would be designated as Closed to motor vehicle use. Administrative entry for critical

activities to ensure public health and safety (i.e. fire suppression and hazardous fuels treatments) would be granted on a case-by-case basis.

Mayfield
The Airport Allotment and the area within the fence around Mayfield Pond would be Closed to motor vehicles.

Millican Plateau
The Millican Plateau OHV area would be maintained for OHV use on designated roads and trails (the size of the area and seasons of use may vary by alternative).
The following areas would be Closed to motor vehicles:

- Powell Butte ACEC/RNA
- Isolated BLM parcels within the Juniper Acres subdivision
- Isolated block of public land on top of Powell Butte (except for a designated entry road and parking area if private lands or an easement is acquired that provides legal access to BLM managed lands).
- Millican Cliff area on east side of Millican Road

North Millican
The North Millican OHV area would be maintained for OHV use on designated roads and trails (the size of the area, trail density, and seasons of use may vary by alternative). The ODOT Pit Play Area would be Open year round. Hill climbs would be closed and rehabilitated if necessary.

Prineville

The following areas would be designated as Closed to motor vehicles:

- The 160-acre Barnes Butte Parcel
- The 640-acre Ochoco Reservoir parcel
- The Dry Canyon parcel located in T 15 S., R 14 E., Sec. 3

Prineville Reservoir
Motorized travel in the Taylor Butte area would be Limited to designated roads.

Steamboat Rock

The following areas would be designated Closed to motor vehicles:

- All isolated parcels northwest of Redmond would be designated as Closed to motor vehicles year-round, except for BPA powerline parcel[19].
- BLM parcel at Crestridge Estates.
- Both BLM parcels at Tetherow Buttes
- The BLM parcel adjacent to Lower Bridge Estates

[19] This area, due to multiple access points and private property boundaries, would be difficult to close.

- Approximately 120-acre area of BLM land north of Parkey Road and NW 81st Street in Crooked River Ranch.

- Vehicle access to Steamboat Rock would be limited to designated parking areas, in order to control the expansion of cleared areas surrounding the rock.

Transportation and Utilities

Management direction Common to Alternatives 2 – 7 would add components to the transportation and utility management direction that is Common to All Alternatives, or otherwise not changed by this RMP. These added components are primarily in the areas of regional and local transportation systems, but also include direction that relates to utility corridors and future new or expanded rights-of-way.

Management direction Common to Alternatives 2 – 7 emphasizes regional and local integrated transportation planning, provides transportation corridor allocations for anticipated needs and provides a mechanism to reduce the amount of redundant or unneeded roadways and minimize the fragmentation of wildlife habitat and public land ownership patterns.

Common to Alternatives 2 - 7 would be the designation of a transportation corridor for the relocation of State Highway 126 to avoid the proposed runway expansion and subsequent protection zone. The proposed corridor would be ½ mile wide and extend for approximately 1 ½ miles (see Map 2). Until a final determination of the need for that corridor to occur on public lands was made, other uses within that area would not preclude future use of the area that purpose.

Local Transportation

Management direction Common to Alternatives 2 - 7 would establish an integrated, designated transportation system within the planning area with road management objectives that would include designated maintenance levels, vegetative condition, and the purpose for access. The number and location of roads that are designated collectors varies by alternative. Local roads would not be designated under any alternative, but would be designated during subsequent site-specific plan implementation.

Management direction Common to Alternatives 2 - 7 would provide for designating future site-specific locations and numbers of recreation and travel access points and development standards. Guidelines would be provided for working with state and local governments to eliminate unsafe access points for both roads and trails, and to reduce potential conflicts between motorized recreation and other uses.

Management for local roads that primarily provide access to BLM-administered lands would include criteria Common to Alternatives 2 - 7 that would be used in the future to designate specific roads that would become part of the transportation system. This includes, but is not limited to, consideration for public access for recreation or other authorized land uses, emergency access for rural residents, fire and resource protection needs, and wildlife habitat disturbance or fragmentation.

The differences in the transportation systems for each of these alternatives are highly dependent upon future decisions concerning the local road configuration. The two resources most likely to influence these configurations are recreation and wildlife. In general, those areas with “primary” wildlife emphasis are likely to have fewer local roads that remain open compared to areas with minor wildlife emphasis. Non-motorized categories of recreational use include designations labeled “non-motorized emphasis” and “non-motorized exclusive”. Areas designated as non-motorized emphasis allow

motorized use on roads, but not on trails. Non-motorized exclusive areas are closed to all motorized uses. In some cases, areas that have a non-motorized recreation emphasis and a primary wildlife emphasis would have the fewest future local road designations.

Right-of-Way Corridors

New areas identified as priority by the Western Utility Group in 2002 would be added to the area designated in the Western Regional Corridor Study of 1993. These areas are identified as "Western Utility potential corridors." All existing rights-of-way would be designated as "future local corridors" to facilitate collocation of compatible uses.

New or expanded right-of-way projects would require appropriate mitigation to reduce unnecessary roads in an area and to minimize the fragmentation of public lands. Appropriate mitigation may include but not be limited to vacating or transferring jurisdiction of roads no longer needed in an area, seasonally or permanently closing other roads within an area, limiting seasons or amounts of uses within an area, or seeding and rehabilitating areas in the vicinity of new or expanded projects.

Land Ownership

Alternatives 2 - 7 would identify lands for retention based on resource values and overall management objectives; lands for disposal that generally do not provide substantial resource, public, or tribal benefits that may not be cost effective for the BLM to manage or that would represent a greater public benefit in other ownership; and lands for community needs and uses.

In general, Alternatives 2 - 7 would provide direction to manage lands to improve the effectiveness of habitats and management capabilities, and identify desirable acquisition parcels based on overall resource values and management and administrative objectives.

Public Health and Safety

Common to Alternatives 2 - 7 management direction would emphasize a reduction and eventual end to dumping, especially in habitual dumping areas, reducing the potential for human-caused wildland fire in high-risk areas, and an increase in the enforcement of existing Oregon state and local laws. Common management direction would also minimize the chance of errant firearm discharge toward public land users and adjacent residents, provide safe and compatible recreation opportunities, and protect natural and cultural resources.

Habitual - Illegal Dumping Areas

Common to Alternatives 2 - 7 management direction would emphasize reducing opportunities for illegal dumping of residential, commercial, industrial, and hazardous waste throughout the planning area, and especially in habitual dumping areas. Closure or restriction of user-created travelways or local roads that access habitual dumping areas would serve as the primary tool to reduce dumping.

The following habitual dumping sites have been identified as being especially problematic, and would be placed on a priority list:

1. South of Prineville along Millican Road
2. South of Prineville at Juniper Canyon
3. South of Prineville off Remington Road;
4. South of O''Neil Highway and west of the North Unit Canal;

5. East of Redmond and west of the North Unit Canal;
6. South of Redmond along Airport Avenue;
7. Northeast of Bend off of the Powell Butte Highway;
8. Immediately north and south of Alfalfa Market Road;
9. Barr Road in the southern portion of Cline Buttes
10. Lands at the State Highway 126/Barr Road/Buckhorn Road intersection
11. Steamboat Rock area west of Terrebonne and South of Crooked River Ranch;
12. Numerous locations in La Pine.

Campfires

Common to Alternatives 2 – 7, management direction would provide for public health and safety and appropriate recreation opportunities, and reduce the risk of wildland fire associated with high use, habitual problem areas and/or special management considerations.

The following areas would be closed to campfires seasonally, from June 1 to October 15 Common to Alternatives 2 - 7. If determined necessary, the fire closures could be extended based on existing conditions:

- All BLM parcels in the Steamboat Rock block;
- All BLM parcels in the Smith Rock block;
- Awbrey Falls block in Cline Buttes.

The following areas would be closed to campfires all year in Common to Alternatives 2 - 7:

- Powell Butte RNA;
- Horse Ridge ACEC/RNA;
- Wagon Roads ACEC;
- Tumalo Canal ACEC;
- BLM parcel north of Highway 126 and adjacent to Cline Falls State Park
- Redmond Caves parcel;
- All designated parking areas, staging areas, and trailheads unless specifically authorized and posted.

Law-Enforcement

Common to Alternatives 2 – 7, management direction would help promote the agency goal of maintaining a consistent and cooperative working relationship between local, state, and law enforcement, streamlining regulations where possible to improve that cooperation.

To enhance this streamlining, and Pursuant to 43 CFR 924.0-3 and 9264.1, the following acts would be prohibited on BLM land within the UDRMP planning area administered by the Bureau of Land Management:

- Operation and use of a motor vehicle on public lands in violation of Oregon State motor vehicle laws;

- Possession and or use of alcoholic liquor in violation of any Oregon State alcohol liquor laws;
- Taking possession of, occupying, or otherwise using public lands for residential purposes without a permit from the Bureau of Land Management;
- Possession and or use of a firearm in violation of any Oregon State firearm laws.

Firearm Discharge

Common to Alternatives 2 – 7, management direction would minimize risk of errant firearm discharge to users of public lands and neighbors, and provide safe and compatible recreation opportunities. To meet these objectives, public lands would be closed to all firearm discharge[20] or firearm discharge unless legally hunting[21] now or in the future. Alternatives 2 – 7 would include a common emphasis to coordinate with local governments to reduce the risk of errant firearm discharge in and around residentially zoned[22] areas adjacent to BLM managed lands. Decisions concerning areas open or closed to firearm discharge would consider numerous factors, including those listed below. These factors provide a framework for present and future decisions that would protect resource values at risk, preserve public health, safety, and welfare, minimize user conflicts, and maintain consistency and cooperation. Tables 2-14a and 2-14b describe areas that would be closed[23] under Common to Alternatives 2 - 7 conditions of those closures.

- **High Density Use Areas**-lands may be closed based on an evaluation of the present and future intensity of recreational use such as the type and variety of recreational activity, safety of users, type and size of recreational groups, geography, topography, presence of facilities (parking lots, bathrooms, roads, trails, interpretive signs and exhibits), ownership and use of surrounding properties, and ease of closure enforcement.
- **Compatible Recreation Opportunities** – Areas with a non motorized exclusive recreation emphasis would be closed to all firearm discharge, or all firearm discharge unless legally hunting.
- **Natural Resource Protection** – BLM lands with reoccurring firearm discharge problems, or lands containing important natural and cultural resources (including but not limited to unique natural resources, sensitive species, geologic features, and historical and archaeological remains) may be closed to all firearm discharge or firearm discharge unless legally hunting.
- **Intergovernmental Cooperation** – Cooperative closures would be considered where city, county, state or federal agencies that own, manage, or have legal jurisdiction over adjacent lands have established similar closures. These types of closures would include but are not limited to, closures adjacent to residential areas with similar city or county-wide closures, state or county parks, or areas within urban growth boundaries. Exact area and conditions of these closures would be determined through site-specific analysis, considering factors such as things such as the ease of boundary identification and local conditions, but would generally be between 150 yards and one mile in depth.

[20] A closure to all firearm discharge would not apply to:
1. A person conducing the official business of BLM personnel or their designee, including but not limited to: Acting in defense or protection of an individual, dispatching a critically injured animal for humane purposes, or dispatching a dangerous or damage-causing animal, and
2. Discharge of projectiles with a limited range where, should the shooter miss their target, the projectile is likely to hit the ground before hitting other unintended targets including but not limited to: A bow or compound bow and arrow, a slingshot, a BB gun, or a paintball gun, and
3. Discharge of weapons utilizing "blank" ammunition where no projectile is discharged including but not limited to: Blanks for dog training purposes, or by the military for official training purposes.

[21] Hunting is defined as "To take or attempt to take any wildlife by means involving the use of a weapon or with the assistance of any mammal or bird (ORS 496.004 (10))."

[22] May apply to other types of land use zones with non-conforming uses, and high-density residential developments in non-residential zones.

[23] All existing closures provide for the authorized officer to make exceptions to the closure on a case-by-case basis.

Table 2-13a: Closed to all firearm discharge

Cline Buttes Block	Cline Falls State Park, BLM land across Hwy 126 from Cline Falls SP, 2 triangular isolated pieces east of Middle Deschutes River, Jaguar Road isolated parcel, Young Avenue isolated parcel
Horse Ridge Block	40-acre and 80-acre peninsulas of BLM on the west side of the Conestoga Hills subdivision
Northwest Block	120-acre north-south isolated block, 2 40-acre southernmost isolated blocks
Bend/Redmond Block	Redmond Caves, isolated 40-acre parcel with white bridge
Steamboat Rock Block	All isolated pieces, BPA station
Prineville Reservoir Block	160 acres surrounded by Prineville Lake Estates, Units 1&2 subdivision
La Pine Block	8 isolated parcels north of La Pine

Table 2-13b: Closed to firearm discharge unless legally hunting

Mayfield Pond Block	½ mile around Alfalfa Pond
Badlands Block	½ mile around Reynolds Pond
Steamboat Rock Block	Large parcel – north of Lower Bridge Road, Middle Deschutes WSR, isolated pieces along Middle Deschutes and Crooked Rivers north of WSR boundaries, western portion of Steelhead Falls WSA outside Middle Deschutes WSR
Prineville Reservoir Block	Isolated and limited contiguous BLM lands near the Crooked River
Millican Plateau Block	Powell Butte RNA
Prineville Block	Powel Butte Block
Horse Ridge Block	Horse Ridge ACEC/RNA
Smith Rock Block	All BLM lands in the Block

Archaeology

Alternatives 2 – 7 would protect "At-Risk," significant archaeological resources from accidental or intentional loss due to human activities and natural causes. The locations of "At-Risk," significant archaeological resources would be withdrawn from the activities of surface disturbing mineral material development. "At-Risk," significant archaeological resources shall include, but not be limited to, the area around Redmond Caves, identified segments of the Horner and Bend-Prineville historic roads, an identified segment of the old Tumalo canal, the area in the vicinity of Pictograph Cave, and the area near Steelhead Falls. Inventories are conducted to determine the amount, extent and nature of the cultural resource base in the planning area.

In addition, Alternatives 2 – 7 would emphasize increasing the public's opportunity to learn about and enjoy the cultural, educational, and recreational uses of heritage resources by interpreting the identified "At-Risk," significant archaeological resources found within the planning area.

Interpretative developments would be based on combined evaluations of:

1. Severity and immediacy of threats (see Table 2-14)
2. Significance of heritage properties as noted in Table 2-15
3. Opportunities for partnerships/cost sharing (Table 2-16)
4. Opportunities for interpretive and public education products as noted in Table 2-17 ("At-Risk," significant archaeological resources that have yet been discovered can also be factored into the Table for prioritization).

Table 2-14: Severity and Immediacy of Threats to Significant At-Risk Resources.

	Soil Compaction	Vandalism	Artifact Collection	Erosion	Surface Disturbance	Dumping	Fire	Total
Historic Tumalo Canals								
Severity of threat	2	1	1	2	2	1	1	10
Immediacy of threat	3	1	2	2	2	1	1	11
Total								**21**
Historic Horner Road								
Severity of threat	3	1	1	1	3	1	1	11
Immediacy of threat	3	1	1	1	3	2	1	12
Total								**22**
Historic Bend-Prineville Road								
Severity of threat	3	1	1	2	2	1	1	11
Immediacy of threat	1	1	1	1	1	1	1	7
Total								**18**
Steelhead Falls								
Severity of threat	1	1	1	1	1	1	1	7
Immediacy of threat	1	1	1	1	1	1	1	7
Total								**14**
Redmond Caves								
Severity of threat	2	3	1	1	1	3	3	14
Immediacy of threat	2	2	2	1	2	3	2	14
Total								**28**
Pictograph Cave								
Severity of threat	1	2	2	1	2	1	2	11
Immediacy of threat	1	1	1	1	1	1	1	7
Total								**18**

Numerical ranking of threat where, Low=1; Moderate=2; High=3
Severe = intense, serious, extreme, unrelenting. Immediate = direct/indirect.

Table 2-15: Priority ranking of at-risk significant archaeological resources

At-Risk Resources	Severity & Immediacy of Threats	Significance of Heritage Property	Opportunities for Partnerships/ Cost-Sharing	Opportunities for Interpretive & Outreach Products	Weighted Ranking (max. 500)
Weight	30%	50%	10%	10%	100%
Horner Road	3	3	3	5	320
Tumalo Canals	3	3	3	5	320
Redmond Caves	4	1	4	5	260
Bend/Prineville Road	2	2	2	2	200
Steelhead Falls	2	1	2	2	150
Pictograph Cave	2	1	1	2	140

Weighted ranking is determined by multiplying severity and immediacy of threats, heritage property significance, and opportunities by their respective weight percentages.
(Example): Horner Road: 3x30%; 3x50%; 3x10%; and 5x10% = 320.

RANKING KEY

Severity/Immediacy of Threats:
5 = 35-42
4 = 27-34
3 = 19-26
2 = 11-18
1 = 0-10

Potential Significance of Heritage Property
5 = A, B, C, D, & Discretionary
4 = A, B, C, D
3 = Three of A, B, C, or D
2 = Two of A, B, C, or D
1 = One of A, B, C, or D

Opportunities for Partnerships/Cost-Sharing
5 = 100% of participation/funding likely
4 = 80% of participation/funding likely
3 = 60% of participation/funding likely
2 = 40% of participation/funding likely
1 = 20% of participation/funding likely

Opportunities for Interpretive & Public Outreach Products
5 = 5 or more products
4 = 4 products
3 = 3 products
2 = 2 products
1 = 1 products

Table 2-16: Opportunities for Partnerships and Cost-Sharing

	Redmond Caves	Steelhead Falls	Horner Road	Bend-Prineville Road	Tumalo Canals	Pictograph Cave
City of Redmond	X					
CTWS	X	X				X
Deschutes County			X	X		
Deschutes NF	X					
ASCO	X	X	X	X	X	X
Deschutes Co. Hst. Soc.			X	X	X	
Tumalo Irrigation Dist.					X	
BLM Rec. Program	X	X	X		X	
Other Interested Parties						
Total	5	3	4	3	4	2

Numerical ranking of Partnership/cost-sharing opportunities where, 1-2 opportunities =Low; 3-4 opportunities=Moderate; greater than 4 opportunities=High.

Table 2-17: Opportunities for Interpretive/Public Outreach Products

	Redmond Caves	Steelhead Falls	Horner Road	Bend-Prineville Road	Tumalo Canals	Pictograph Cave
Signs	X	X	X	X	X	
Kiosks			X		X	
Self-guided Tours	X		X	X	X	
Brochures	X		X		X	
Interpretive Trail	X		X		X	
Tribal Input	X	X				X
Total	5	2	5	2	5	1

Numerical ranking for development of Interpretive/Public Outreach products where, 1-2 products =Low; 3-4 products=Moderate; greater than 4 products=High.

Alternative 2

Alternative 2 would provide for ecosystem health and diversity by focusing efforts on maintenance of current conditions as described under the Key Concepts, and would anticipate lower amounts of treatment acres, especially prescribed fire acres, than alternatives with an historic emphasis. Alternative 2 would slightly increase the amount of secondary wildlife habitat emphasis, but would not increase the amount of area managed for primary habitat emphasis over the current condition[24]. There would be no additional management direction over that Common to Alternatives 2 - 7 for riparian areas, water quality or quantity, or Special Management Areas.

There would be no change in areas available for salable minerals and only a very slight change for livestock grazing from those identified as Common to Alternative 1. Estimated forest or range products are based on the expected amount of treatment acres (in addition to the Wildland-urban interface (WUI) treatments identified as Common to Alternatives 2 - 7), and are expected to be at about 120,000 cubic feet (600,000 board feet) for Alternatives 2, 4, and 5. Alternative 2 would increase the area available for long-term military use over Alternative 1 by about 7,000 acres.

Recreation emphasis in Alternative 2 would be on providing mixed or multiple use areas with shared facilities. Areas managed exclusively for or with a non-motorized emphasis for trails would be increased over Alternative 1 by about 17%, but would provide the least amount of exclusive non-motorized recreation emphasis of all the alternatives. Most of the geographic areas would emphasize recreation on designated motorized roads or roads and trails, with about 90% of the area available for motorized use on designated roads and trails during the winter use season.

Alternative 2 has the most land designated for retention (Z-1), of all of the alternatives, and the lowest amount of lands available for retention with the possibility of exchange (Z-2). The total amount of land classified for disposal (Z-3) is slightly lower than Alternative 1, but higher than most of the other alternatives. Lands classified as Community Expansion (CE) lands are increased over Alternative 1 and reflect more current information about community needs. There are no special conditions tied to CE lands under Alternative 2.

Designated transportation systems would not change substantially over those in Alternative 1. Alternative 2 would include the designation of a transportation corridor south of Redmond to Deschutes Junction, and would anticipate future local road densities lower or seasonally restricted in areas of high wildlife emphasis, or areas designated for non-motorized emphasis. In accordance with elements Common to Alternatives 2 - 7, designation of a new transportation corridor would anticipate future relinquishment of a similar amount of historic roads in the Bend-Redmond geographic area.

Alternative 2 would not close any areas to all firearm discharge, but would include about a two percent increase in the areas that would be closed to firearm discharge unless legally hunting to reduce the potential for errant firearm to affect ACEC resources, and to increase compatibility with the recreation emphasis of some of the geographic areas.

[24] For this comparison, areas designated as crucial wildlife habitat in the Brothers - La Pine Resource Management Plan or as a result of other cooperative designations like winter closure areas were assumed to reflect a "primary" designation as used by the Upper Deschutes RMP.

Ecosystem Health and Diversity

Vegetation

Alternative 2 would emphasize maintenance and restoration of native plant and animal communities throughout their current range with management activities in priority areas according to specific resource management objectives. Alternative 2 would emphasize restoration of areas identified as "high prioroty for restoration" to grass and shrub-steppe communities. These areas are generally where western juniper has expanded in area or density, and is affecting the hydrologic function of the area. Management efforts would protect and promote the health and integrity of old-growth juniper woodlands and savannah[25] throughout its current range. In lodgepole and ponderosa pine forest ecosystems, objectives would promote healthy and diverse forest systems that would reduce the occurrence of uncharacteristically large and severe disturbances. Management emphasis would be on maintaining or mimicking natural disturbance regimes so that stands are resilient to periodic outbreaks of insects, disease and wildfire. Ponderosa pine would maintain a dominant or co-dominant status with lodgepole pine, including existing late and old structure habitat, throughout its current range.

In general, treatments for ecosystem health and habitat patch size would be smaller under alternatives that emphasize maintenance and restoration of the current range of vegetation (Alternatives 2, 4, and 5) than those that emphasize an historic range (Alternatives 3, 6 or 7). Treatments would be more focused on accomplishing specific objectives for each of the priority areas and fewer total acres would be treated compared to historic range alternatives. There would be a higher proportion of small and intermediate sized ponderosa and lodgepole pine. Stand density would be higher and average diameter of trees would be smaller. Over time, understory thinning would produce a two to three layer canopy structure in most ponderosa pine stands.

In general, Alternative 2 would treat the following acres annually (see also Comparison of Alternatives, Table 2-1).

Treatment Type	Year 1-5	Year 6-15	Total (15 Years)
Prescribed Fire	1,265	5,253	58,855
Mechanical	11,385	5,253	109,455
Totals	**12,650**	**10,506**	**168,310**

Wildlife

Alternative 2 highlights many of the elements of the wildlife management strategy that are Common to Alternatives 2 - 7. These components are combined with the vegetation, land uses, special management area, recreation, and transportation strategies to reflect an overall emphasis on managing multiple use in many of the geographic areas.

General management emphasis for terrestrial source habitats would be to provide for multiple species needs within current species range in conjunction with vegetation community distribution. Management would emphasize re-patterning vegetation patch size and distribution in habitat areas to be more consistent with characteristic natural disturbance regimes and ecosystem characteristics.

Under this alternative, management emphasis of locally important wildlife species such as deer, elk, pronghorn, or sage grouse would be to maintain or improve habitats,

[25] The terms "woodland" and "savannah" in the context of this RMP encompass all components of the ecosystem. An "ecosystem" includes all plant and animal life, in addition to physical factors such as soils, water, and geology. The tree component is dominated by western juniper, including both old-growth and younger trees. Woodland management also considers the understory components of the community (shrubs, grasses and forbs). Sagebrush-dominated openings and riparian and wetland vegetative types are also found within the woodlands.

to support healthy productive and diverse wildlife populations, and, where consistent with habitat capabilities and national conservation direction, contribute to meeting state wildlife species management objectives for deer, elk and pronghorn. General wildlife habitat emphasis by geographic area is displayed in Table 2-18, Wildlife Emphasis Summary, Alternative 2.

Geographic Areas

Under Alternative 2, Wildlife Emphasis Levels would be the same as outlined for Common to Alternatives 2 - 7. Wildlife habitat emphasis by specific geographic area and species of local importance can be found in Tables 2-19 – 2-25, Wildlife Emphasis Areas by Species.

This alternative would manage approximately 25 percent of the planning area with a Primary emphasis, 5 percent with a Secondary emphasis, and 70 percent with a Minor emphasis for wildlife (see Table 2-1, Comparison of Alternatives,, and tables below).

Special Management Areas

As in all of the other action alternatives, Alternative 2 would include dropping the ACEC designation for the Upper Crooked River because its Wild and Scenic River status protects the area's values and portions of the Wagon Roads ACEC that no longer meet the designation criteria, and add a new portion that does. Approximately 1050 acres would also be designated for the Tumalo Canal ACEC and the existing boundaries of the Peck's Milkvetch ACEC would be continued.

Total acres designated as ACEC (existing and new) under this alternative are 23,912.

Table 2-18: Wildlife Emphasis Summary

Wildlife Emphasis Areas - Alternative 2

	Primary Percent / # acres	**Secondary** Percent / # acres	**Minor** Percent / # acres	**Totals** Percent / # acres
All Wildlife Emphasis Areas	25% / 99,552	05% / 21,999	70% / 281,769	100% / 403,320
Golden Eagles	38% / 15,313 ac.	07% / 2,658 ac.	55% / 21,996 ac.	100% / 39,967 ac.
Sage grouse	20% / 15416 ac.	< 01% / 268 ac.	79% / 61,919 ac.	100% / 77,603 ac.
Elk	32% / 57,472 ac.	01% / 2,001 ac.	67% / 120,699 ac.	100% / 180,172 ac.
Deer	32% / 84,626 ac.	06% / 15,691 ac.	62% / 163,189 ac.	100% / 263,506 ac.
Pronghorn	19% / 31,432 ac.	06% / 9,833 ac.	75% / 125,913 ac.	100% / 167,178 ac.
Migration and Connectivity	16% / 11,137 ac.	5% / 3,538 ac.	79% / 55,276 ac.	100% / 69,951

Table 2-19. Wildlife Emphasis Area - Alternative 2 - Mule Deer.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTA
Badlands	29552	12	26	29590
	99.87%	0.04%	0.00%	
Cline Buttes	0	593	14674	15267
	0.00%	3.88%	96.12%	
Horse Ridge	24766	0	3	24769
	99.99%	0.00%	0.01%	
Mayfield	1	1588	0	1589
	0.06%	99.94%	0.00%	
Millican Plateau	3772	5	48904	52681
	7.16%	0.01%	92.83%	
North Millican	1062	0	52704	53766
	1.98%	0.00%	98.02%	
Prineville	1040	7373	402	8815
	11.80%	83.64%	4.56%	
Prineville Reservoir	4684	5819	28972	39475
	11.87%	14.74%	73.39%	
Smith Rock	2110	0	0	2110
	100.00%	0.00%	0.00%	
South Millican	2	301	17252	17555
	0.01%	1.71%	98.27%	
Northwest	6745	0	0	6745
	100.00%	0.00%	0.00%	
Steamboat Rock	5100	0	252	5352
	95.29%	0.00%	4.71%	
Tumalo	5792	0	0	5792
	100.00%	0.00%	0.00%	
TOTAL	**84626**	**15691**	**163189**	**263506**
	32.12%	**5.95%**	**61.93%**	

Table 2-20. Wildlife Emphasis Area - Alternative 2 - Rocky Mountain Elk.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29577	12	26	29615
	99.87%	0.04%	0.09%	
	0	0	0	0
Cline Buttes	319	593	28,245	29,157
	1.09%	2.03%	96.87%	
Horse Ridge	5484	0	0	5484
	100.00%	0.00%	0.00%	
Lapine	3206	0	27502	30708
	10.44%	0.00%	89.56%	
Mayfield	0	439	0	439
	0.00%	100.00%	0.00%	
Millican Plateau	0	0	15105	15105
	0.00%	0.00%	100.00%	
North Millican	673	0	34000	34673
	1.94%	0.00%	98.06%	
Prineville	34	905	0	939
	3.62%	96.38%	0.00%	
Prineville Reservoir	1342	52	10300	11694
	11.48%	0.44%	88.08%	
Smith Rock	0	0	0	0
	0	0	0	
South Millican	0	0	4834	4834
	0.00%	0.00%	100.00%	
Northwest	6745	0	0	6745
	100.00%	0.00%	0.00%	
Steamboat Rock	4284	0	687	4971
	86.18%	0.00%	13.82%	
Tumalo	5808	0	0	5808
	100.00%	0.00%	0.00%	
TOTAL	**57,472**	**2,001**	**120,699**	**180172**
	31.90%	**1.11%**	**66.99%**	

Table 2-21. Wildlife Emphasis Area - Alternative 2 - Golden Eagle.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	0	0	0	0
	0	0	0	
Bend/Redmond	0	0	128	128
	0.00%	0.00%	100.00%	
Cline Buttes	782	44	4,578	5,404
	14.47%	0.81%	84.72%	
Horse Ridge	2158	0	1	2159
	99.95%	0.00%	0.05%	
Lapine	0	0	0	0
	0	0	0	
Mayfield	0	0	0	0
	0	0	0	
Millican Plateau	1714	0	7791	9505
	18.03%	0.00%	81.97%	
North Millican	1	0	4860	4861
	0.02%	0.00%	99.98%	
Prineville	868	859	202	1929
	45.00%	44.53%	10.47%	
Prineville Reservoir	1994	1755	3312	7061
	28.24%	24.85%	46.91%	
Smith Rock	997	0	0	997
	100.00%	0.00%	0.00%	
South Millican	0	0	513	513
	0.00%	0.00%	100.00%	
Northwest	1038	0	0	1038
	100.00%	0.00%	0.00%	
Steamboat Rock	3693	0	611	4304
	85.80%	0.00%	14.20%	
Tumalo	2068	0	0	2068
	100.00%	0.00%	0.00%	
TOTAL	**15,313**	**2,658**	**21,996**	**39967**
	38.31%	**6.65%**	**55.04%**	

Table 2-22. Wildlife Emphasis Area - Alternative 2 - Pronghorn.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	9367	12	0	9379
	99.87%	0.13%	0.00%	
Bend/Redmond	0	0	25948	25948
	0.00%	0.00%	100.00%	
Horse Ridge	19385	0	0	19385
	100.00%	0.00%	0.00%	
Mayfield	38	5561	19090	24689
	0.15%	22.52%	77.32%	
Millican Plateau	1798	0	39437	41235
	4.36%	0.00%	95.64%	
North Millican	446	0	24073	24519
	1.82%	0.00%	98.18%	
Prineville	396	2380	354	3130
	12.65%	76.04%	11.31%	
Prineville Reservoir	0	1552	0	1552
	0.00%	100.00%	0.00%	
Smith Rock	0	0	0	0
	0	0	0	
South Millican	2	328	17011	17341
	0.01%	1.89%	98.10%	
Northwest	0	0	0	0
	0	0	0	
Steamboat Rock	0	0	0	0
	0	0	0	
Tumalo	0	0	0	0
	0	0	0	
TOTAL	**31432**	**9833**	**125913**	**167178**
	18.80%	**5.88%**	**75.32%**	

Table 2-23. Wildlife Emphasis Area - Alternative 2 - Sage grouse.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	0	0	0	0
	0	0	0.00%	
Cline Buttes	0	0	0	0
	0	0	0	
Horse Ridge	14355	0	1	14356
	99.99%	0.00%	0.01%	
Mayfield	0	0	0	0
	0	0	0	
Millican Plateau	0	0	1943	1943
	0.00%	0.00%	100.00%	
North Millican	1060	0	43353	44413
	2.39%	0.00%	97.61%	
Prineville	0	0	0	0
	0	0	0	
Prineville Reservoir	0	19	0	19
	0.00%	100.00%	0.00%	
Smith Rock	0	0	0	0
	0	0	0	
South Millican	1	249	16622	16872
	0.01%	1.48%	98.52%	
Northwest	0	0	0	0
	0	0	0	
Steamboat Rock	0	0	0	0
	0	0	0	
Tumalo	0	0	0	0
	0	0	0	
TOTAL	**15416**	**268**	**61919**	**77603**
	19.87%	**0.35%**	**79.79%**	

Table 2-24. Wildlife Emphasis Area - Alternative 2 - Migration and Connectivity Corridors.

Geographical Area	Species	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
La Pine	Deer	7449	0	33194	40643
		18%	0%	82%	
Badlands	Pronghorn	1777	11.8	1	1789.8
		99%	1%	0%	
Mayfield Pond	Pronghorn	37.7	3407	1478.7	4923.4
		1%	69%	30%	
Millican Plateau	Pronghorn	22	0	9834.5	9856.5
		0%	0%	100%	
North Millican	Pronghorn	0	0	4039	4039
		0%	0%	100%	
Research Natural Area	Pronghorn	510	0	0	510
		100%	0%	0%	
Subtotals for Pronghorn		**2346.7**	**3418.8**	**15353.2**	**21118.7**
		11%	**16%**	**73%**	
Prineville	Elk	0	67.5	0	67.5
		0%	100%	0%	
Prineville Reservoir	Elk	1341.7	51.8	6728.3	8121.8
		17%	1%	83%	
Subtotals for Elk		**1341.7**	**119.3**	**6728.3**	**8189.3**
		16%	**1%**	**82%**	
Subtotals for Elk		**11137.4**	**3538.1**	**55275.5**	**69951**
		16%	**5%**	**79%**	

Table 2-25. Wildlife Emphasis Area - Alternative 2 - All Species' Habitats.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29577	12	26	29615
	99.87%	0.04%	0.09%	
Bend/Redmond	1326	0	40820	42146
	3.15%	0.00%	96.85%	
Cline Buttes	1,182	593	30,089	31,864
	3.71%	1.86%	94.43%	
Horse Ridge	25164	0	3	25167
	99.99%	0.00%	0.01%	
Lapine	7705	0	33486	41191
	18.71%	0.00%	81.29%	
Mayfield	841	6784	19383	27008
	3.11%	25.12%	71.77%	
Millican Plateau	3772	5	52506	56283
	6.70%	0.01%	93.29%	
North Millican	1062	0	53190	54252
	1.96%	0.00%	98.04%	
Prineville	2931	8458	473	11862
	24.71%	71.30%	3.99%	
Prineville Reservoir	4684	5819	28972	39475
	11.87%	14.74%	73.39%	
Smith Rock	2119	0	0	2119
	100.00%	0.00%	0.00%	
South Millican	2	328	17357	17687
	0.01%	1.85%	98.13%	
Northwest	6745	0	0	6745
	100.00%	0.00%	0.00%	
Steamboat Rock	6634	0	5464	12098
	54.84%	0.00%	45.16%	
Tumalo	5808	0	0	5808
	100.00%	0.00%	0.00%	
TOTAL	**99,552**	**21,999**	**281,769**	**403320**
	24.68%	**5.45%**	**69.86%**	

Caves

Portions of Pictograph Cave would be closed to the installation of bolted climbing routes to protect archaeological resources. Installation of bolted climbing routes would be allowed in approved areas within the cave after site-specific resource survey work. Seasonal closures would be maintained for bat hibernacula from October 15 – May 1.

Land Uses

Livestock Grazing

In this alternative (as in Alternatives 2 - 7), the BLM would use a formula to estimate potential for conflict and demand to help identify where problems are likely to occur (for additional details of how this formula works, see Common to 2-7 section in this chapter, and Chapter 4, Livestock Grazing Assumptions). This alternative does not include any management changes to reduce conflicts, other than those already listed in CTA and CT2-7. Livestock grazing would continue to be allowed regardless of level of conflict or demand.

Minerals

Management guidelines would provide some standardized mechanisms for mitigating mineral development conflicts with recreation and residents, primarily focused on establishing setbacks defined in Common to Alternatives 2 – 7.

Mineral material sales may not be located and would not occur within 1/8 mile of residentially zoned areas or designated recreation sites. Roads that feed from BLM-administered land into residentially zoned areas may be used for mining-related traffic only if alternate routes are not available. Under this alternative, approximately 334,893 acres are available for mineral material sales. Seasonal restrictions on all mineral operations would apply to 11,327 acres and surface occupancy for fluid mineral leasing would not be allowed on 38,151 acres (see Map S-23, Minerals Alternative 2).

Forest Products

Harvest of commercial timber and other wood products would occur primarily in conjunction with fire hazard reduction and ecosystem restoration treatments within the priority project areas identified under Vegetation – Alternative 2. Smaller project areas based on more focused resource objectives would produce a slightly smaller yield of forest products than under Alternative 3. Priority treatments that could produce commercial forest products would be based on maintenance of existing range of ponderosa pine and vegetative treatment objectives for fuels, forest health and wildlife habitat (see Table 2AA-Alternative Summary Table for forest product volumes produced under each alternative).

Military Use

Under Alternative 2, approximately 36,400 acres would be permitted for military use, compared to the 29,744 acres currently permitted.

Management efforts would ensure consistency of planned and approved activities with environmental requirements, integrated resource management plans, and conflict resolution with neighbors on public lands authorized for long-term and short-term military use.

Training Area Boundaries
Military training would be permitted as shown in Map 35 (approximately 36,397 acres) of the BLM-administered lands located south of the O'Neil Highway; north of the Bend Sewage Treatment facility, Bend Airport, and BLM Road 6589-B; east of Highway 97; and west of the private lands within the Powell Butte Community.

Total Area Available by Classification Type (Type of Training) (A, B, C, D, E, LZ/DZ):
From the current permitted area, the boundary would be adjusted in Areas C and E (lands east and south of the currently permitted area) to reduce concentration of military training on remaining lands, straighten boundaries, and expand the safety buffer around LZ/DZ in Area E. The boundary of the area north of Highway 126 would include a ¼ of a mile buffer inside the public lands boundary on the east side, except for the access from the north from the O'Neil Highway.

Buffer Areas
No military activity would be permitted within ¼ mile of the urban growth boundary of the City of Redmond, except as needed to access the approved area.

Recreation

Alternative 2 would emphasize the use of shared road and trail facilities for all users, to a much greater degree than all other action alternatives and Alternative 1. Approximately 77 percent of the planning area is managed for multiple use on shared facilities in Alternative 2. The only large areas where trails are developed for non-motorized use are the Skeleton Fire and Horse Ridge areas, although some routes in the Badlands are managed for non-motorized use only. Many small parcels of public land are Closed to motorized use; however, this alternative closes the least amount of land to motorized use (approximately 5 percent). The largest single area designated Closed to motorized use would be the Smith Rock parcel of BLM-administered land.

Alternative 2 would also provide the greatest opportunity for unrestricted year-round access to public lands, with approximately 92 percent of the area open year-round. Seasonal closures are generally limited only to the Northwest and Tumalo blocks of BLM managed land. Motorized recreation opportunities would be spread throughout the planning area, with Millican Valley, the Bend/Redmond block, and Cline Buttes being managed for motorized use on designated trail systems. Management of the Bend/Redmond block would change from Open to a designated system. Management of the Cline Buttes block would change from Limited to "existing roads and trails' to a specific designated trail system (see Map 16, Recreation Emphasis-Alternative 2).

Geographic Areas

Badlands
Motorized travel would be restricted to a designated network of inventoried routes. The area would remain Open year round for both motorized and non-motorized public use. Improvements would be made at entry areas, to allow for better defined parking areas, trailhead, and improvements of boundary fences to help minimize entry at undesignated locations and cross-country travel.

The Badlands area would be managed as Limited to designated roads (see Map S-2), and Route 8 (approximately 8 miles), Route 9, and parts of routes 4, 5, 6, and 7 (approximately 12 miles) would be designated Open to motor vehicles.

Bend/Redmond
While this area changes from an Open (Alternative 1) to a Limited designation, all recreation types would be expected to share the same trails (with the exception of a North Unit Canal regional trail and trails within the Wagon Roads ACEC). Select roads

of historic and cultural value may be removed from the designated road system. Site improvement goals would include staging areas, an OHV play area, and grade-separated crossings of State Highway 126, Powell Butte Highway, and other new rights-of-way roads. The number of motorized access points into the area would be reduced.

Cline Buttes
The entire Cline Buttes block would be managed for multiple use, with motorized and non-motorized users sharing most of a designated road and trail system. Approximately 25 to 40 miles of multi-use trails are designated within Cline Buttes. Several smaller trail loops are provided for non-motorized use, including some of the designated trails along the Tumalo Canals, and any trails designated within ½ mile of the Deschutes River. The area has a designated system of access points, which are improved and have identifiable boundaries.

The entire block would be designated as Limited to designated roads and trails, except for a ½-mile buffer along the Deschutes River, which would be designated Closed to motorized vehicles.

Horse Ridge
Under this alternative, the management focus for the Skeleton Fire area and Horse Ridge would be on non-motorized trail use on designated trails. Designated roads would be present in these areas, but at a low density and layout similar to what is currently available. Some existing roads would be reopened in the Skeleton Fire area, to allow for loop drives and recreational use by hikers, runners, etc. Existing 2-track roads that are currently closed to motorized use may be included as part of a designated, signed, non-motorized trail system. Improvements would be made to parking and staging areas to serve hikers, equestrians, mountain bikers and other users.

Horse Ridge would be designated as Limited to designated roads only, with the exception of closed areas described under Common to Alternatives 2 - 7 (Small parcels adjacent to Conestoga Hills, Rickard Road, and the Horse Ridge ACEC/RNA).

Mayfield
This alternative would allow for more motorized use in the main block than is presently provided. The main block would be managed for motorized use on a larger designated road network than the current system. Designation of additional motorized trails in the area would be emphasized. The focus of a designated, motorized trail system would be on the center and northern portion of the main block, to minimize conflicts with adjacent landowners.

The main block between Powell Butte Highway and Alfalfa Market Road would be designated as Limited to designated roads and trails. The Airport Allotment area would be designated Closed to motor vehicles and the area south of Alfalfa Market Road would be designated as Limited to designated roads.

Millican Plateau
The recreation management emphasis for the area would be OHV opportunities. The existing boundaries of the Millican Valley OHV area would be expanded and the designated, year-round trail system increased, particularly in the western and northern portions of the area. Improvements would be made to staging areas, and provisions made for safe, grade-separated crossings of Millican and Reservoir Roads. While most of the area would be managed for OHV use on designated trails, both the Powell Butte RNA and the isolated parcel at the top of Powell Butte would remain Closed to motor vehicles. The current northern half of Millican Plateau area would be expanded.

North Millican
Alternative 2 manages the area for multiple use, with a small portion of the area located adjacent to the Badlands WSA emphasizing non-motorized trails. The alternative would improve trailheads and create a group use area at the base of Dry Canyon, which would replace the dispersed parking and camping occurring in the area presently. Many of the improvements established in the Millican Valley Plan would be implemented.

The existing boundaries of the Millican Valley OHV area would be expanded and the designated trail system would be increased, particularly in the eastern portion of the area. Long, straight, high-speed trail alignments would be replaced by more technical routes that offer more variety, and longer riding experiences. Trails would be realigned to take advantage of fewer safe crossings of Millican/West Butte Road, and frontage trails would be developed as needed to collect trail traffic and route it to designated crossings. The trail system would be improved to allow better stand-alone riding opportunities on both the west and east side of West Butte Road.

The entire area would be designated as Limited to designated road and trails.

Northwest
The area would be managed for both motorized and non-motorized recreation. Emphasis for motorized trail development would be on providing future connections to larger trail systems on Crooked River National Grasslands (CRNG), if needed. The area would be Closed to motorized use seasonally to match adjacent policy on CRNG, but would remain open year-round for non-motorized use. The Sisters Climbing area would be managed with an emphasis on rock climbing use, and would be signed and identifiable as BLM managed land.

Motorized travel in main block would be Limited to designated roads and trails and limited to April1 thru November 30. Motorized travel in isolated parcels west of Squaw Creek would be Limited to designated roads and limited to April 1 thru November 30. This alternative would designate Cascade Mountain/Willamette Valley Wagon Roads (CM/WV) as a shared use BLM system designated trail that links to the access road for Alder Springs Trailhead. Development of one or more loop trails off the main CM/WV trail would be considered.

Prineville
Alternative 2 treats the area much like the current management, keeping most of the scattered tracts open to motorized use year-round, and not providing any recreation infrastructure or management. A few problem areas are treated with more specific detail, mainly to respond to erosion or road maintenance problems, or problem dumping areas. The entire area would be designated as Limited to designated roads and trails, except the BLM parcel near the Juniper Canyon summit, which would be designated as Limited to designated roads from March 16 thru November 30.

Prineville Reservoir
Most of the area surrounding Prineville Reservoir would be managed for motorized use on designated roads and trails (Limited designation). The Powderhouse Cove/ Taylor Butte east of State Highway 27 and south of the reservoir would be managed for motorized roads only. The recreation management emphasis for the Powderhouse Cove/Taylor Butte areas would be to develop non-motorized trails to offer an additional recreation opportunity for Prineville Reservoir State Park visitors.

In addition, all isolated parcels, including parcels east of the Bear Creek arm and scattered tracts at the eastern edge of the area, would be designated as Limited to designated roads.

Smith Rock
The entire block would be Closed to motorized vehicles. Additional non-motorized trails may be created, both to solve resource issues, and to meet demand for hiking, mountain biking, and equestrian trail opportunities.

South Millican
Under this alternative, the management focus for the South Millican area would be on maintaining the area as an OHV area, with use allowed on designated roads and trails year-round. Existing trail connections to the North Millican area would be maintained. The South Millican and Fox Butte areas would be Limited to designated roads and trails.

Steamboat Rock
The main public land block within the Steamboat Rock area would be managed for dispersed use, with both motorized and non-motorized use sharing trails and roads. The number of access points would be reduced, and the remaining designated access points would be improved, hardened, and have defined boundaries. New roads or trails are created to link existing roads back to common access points or trailheads. The river parcels adjacent to Crooked River Ranch would continue to be managed to emphasize non-motorized use. Isolated parcels northwest of Redmond would be managed exclusively for non-motorized use, with access improvements to allow access to the middle Deschutes River while minimizing conflicts with landowners.

Main Steamboat Rock Block would be Limited to designated roads and trails. The Deschutes River corridor within Main Steamboat Rock block would be managed as a non-motorized use area (see Map 9, Travel Management Designations Alternative 2)

Tumalo
Motorized trails in main portion of the Tumalo Block (the area north of Tumalo Reservoir) would be considered for development. However, trail development would only be considered if connections to a larger trail system on the Deschutes National Forest or at Cline Buttes are available. The BLM lands to the south of Tumalo Reservoir are closed to motor vehicles, and are managed for non-motorized trail use on designated trails only.

Motorized travel would be Limited to April 1 thru November 31. Motorized travel in main block would be Limited to designated roads and trails, and travel in the smaller block of BLM land to the south of Tumalo Reservoir would be Limited to designated roads only.

Transportation and Utilities

Alternative 2 would emphasize using existing roads as the backbone of the transportation system to access BLM-administered lands. Known county roads, including historic roads, would be designated collector roads for the BLM-administered lands. A new corridor would be allocated for Highway 126 (Common to Alternatives 2 - 7).

Regional Transportation

Alternative 2 would designate a regional transportation corridor between south Redmond near the fairground and north Bend near Deschutes Jct. Alternative 2 would likely require relinquishment of about 17 miles of existing road right-of-way in the Bend-Redmond block at the time the right-of-way grant is issued.

Local Transportation

Alternative 2 would designate about the same configuration of collector roads as does Alternative 1. Management direction Common to Alternatives 2 - 7 indicate that up to 2,562 miles of local roads would be available for future designation or closure.

Alternative 2 identifies 25 percent of the planning area in a primary wildlife emphasis designation and 20 percent in either a non-motorized emphasis or non-motorized exclusive designation. The recreation designations may or may not be included in the primary wildlife emphasis designation (see Recreation and Wildlife Emphasis maps for specific locations).

Right-of-Way Corridors

This alternative would allocate a transportation/utility corridor adjacent to the BN-SF railroad right-of-way approximately ½ mile wide south of Redmond, extending to Deschutes Junction.

Land Ownership

Alternative 2 would emphasize maintenance and expansion of existing large blocks of public lands to provide for the greatest range of public land uses and wildlife connectivity, and improve the administrative efficiency of public land management. Lands available for disposal emphasize use of the BACA bill legislation to maintain funding within the state to acquire other federal lands. Community Expansion (CE) lands are provided for schools, parks, open space, low income housing, and commercial and industrials space that match expected urban growth boundary accretions or address many identified community needs.

Alternative 2 would designate approximately 358,314 acres of BLM administered lands as Z-1 (Map 31). The blocks of public lands identified as Z-1 include Tumalo, Cline Buttes, Bend/Redmond Core, Smith Rocks, Mayfield, Badlands, Horse Ridge, Reservoir West, Reservoir East, Southeast, and the majority of public lands in La Pine north and south of the community. Other, smaller parcels of public land identified include Grizzly Mountain, Ochoco Reservoir, and Juniper Canyon. Approximately 22,279 acres would be designated Z-2, and approximately 12,993 acres would be designated Z-3. In addition, for community use and needs, approximately 5,323 acres would be designated CE.

Public Health and Safety

Alternative 2 would not include any additional closures of BLM land to all firearm discharge above management Common to Alternatives 2 - 7, but would increase the acreage closed to firearm discharge unless legally hunting to approximately 5% of the planning area, in ACECs, and urban parcels (see Table 2-26, below).

Table 2- 26: Closed to firearm discharge unless legally hunting

Tumalo Canal ACEC	Entire ACEC
Tumalo Block	700-acre parcel south of Tumalo Reservoir Road
Bend Redmond Block	BLM land southwest of McGrath Road including Historic Roads ACEC
Mayfield Block	Airport parcel
Prineville Reservoir Block	BLM land ½ mile east of the Lower Crooked WSR plus lands contiguous with, east of, and north of the WSR boundary
Horse Ridge Block	North of Rickard Road, South of Hwy. 20

Alternative 3

Alternative 3 would provide for ecosystem health and diversity by focusing efforts on restoring historic conditions as described under the Key Concepts, and would anticipate higher amounts of treatment acres, especially prescribed fire acres, than alternatives with the current range emphasis. Alternative 3 would increase the amount of primary and secondary wildlife habitat emphasis in the planning area over current direction to about 77 percent of the planning area.[26]. There would be no additional management direction over that Common to Alternatives 2 - 7 for riparian areas or water quality or quantity, but Alternative 3 would include a substantial change in the amount of Special Management Areas designated within the planning area. This alternative would include designation of two new Old Growth Juniper Woodlands ACECs in the Cline Buttes and Mayfield geographic areas to focus research, interpretation, and management of the unique Central Oregon old growth juniper ecosystems. The Juniper Woodlands ACEC would incorporate the Peck's Milkvetch (CTA) and Tumalo Canals (CT 2-7) ACECs. This alternative would also include designation of a scenic ACEC for the Smith Rock area. Alternative 3 would include the greatest amount of Special Management Area designations of all of the alternatives.

There would be only a very slight change in areas available for livestock grazing under Alternative 3 over those identified under Alternative 1. There would be slightly fewer acres available for mineral sales over those identified as Common to Alternatives 2 - 7 as a result of an extended buffer area around residential and recreational areas. New ACEC designations indicate a greater potential for increased cost or limited availability of mineral materials within those areas, but do not include prohibitions on use. Estimated forest or range products are based on the expected amount of treatment acres (in addition to the Wildland-urban interface (WUI) treatments identified as Common to Alternatives 2 - 7), and are expected to be at about 150,000 cubic feet (750,000 board feet) for Alternatives 3, 6, and 7, higher than Alternatives 2, 4, or 5. Alternative 3 would provide about 8000 less acres for long-term military training use with roughly the same boundaries compared to Alternative 1.

The recreation emphasis in Alternative 3 would be much more on providing segregated rather than shared facilities compared to Alternatives 1 or 2. Areas managed exclusively for or with a non-motorized emphasis for trails would be increased over Alternative 1 by about 33 percent, with slightly more emphasis on exclusive non-motorized than non-motorized emphasis areas (which provide motorized use on roads, non-motorized on trails). About half of the geographic areas would emphasize recreation on designated motorized roads or roads and trails, with about 41 percent (5% snow-depth dependent) of the area available for motorized use on designated roads and trails during the winter use season.

Alternative 3 has about the same land designated for retention (Z-1), than Alternative 2, and bout 2 percent more lands available for retention with the possibility of exchange (Z-2) than Alternative 2, but substantially less than Alternative 1. The total amount of land classified for disposal (Z-3) is slightly lower than Alternatives 1 and 2, at about 2% of the planning area. Lands classified as Community Expansion (CE) lands are reduced from both Alternatives 1 and 2, and include limitations on uses for future CE lands to greenbelts and open space.

Designated transportation systems are altered over those in Alternative 1 and 2 by the addition of a transportation corridor south of Redmond to Highway 97 near Quarry Road, and the designation of roads to serve as future collectors in the BLM system. By

[26] For this comparison, areas designated as crucial wildlife habitat in the Brothers - La Pine Resource Management Plan or as a result of other cooperative designations like winter closure areas were assumed to reflect a "primary" designation as used by the Upper Deschutes RMP.

changing the designation of some existing collector roads to local roads, additional roads fall into a category that would make them available either for future designation or closure, depending upon management objectives. Alternative 3 would anticipate future local road densities to be lower or seasonally restricted in areas of high wildlife emphasis, or areas designated for non-motorized emphasis. In accordance with elements common to Alternatives 2 - 7, designation of a new transportation corridor would anticipate future relinquishment of a similar amount of historic roads in the Bend-Redmond geographic area.

Of any alternative, Alternative 3 would close the most acreage to some type of firearm discharge (32% of the planning area); however, most BLM land in the planning area would still be available for hunting (98%). Areas of emphasis would include the Badlands area, Steamboat Rock, and the Tumalo block to improve recreation experiences, and protect sensitive resources.

Ecosystem Health and Diversity

Alternative 3 would emphasize restoring native plant and animal populations to their "historic" distribution on BLM-administered lands. This would include a strong emphasis on restoring grass and shrub communities where western juniper has expanded its historic range or density throughout the planning area. It would also emphasize management for more diverse native animal populations, with less of an emphasis on providing suitable cover habitats for deer and elk outside of the historic range of plant communities that may provide those attributes. Outside of the WUI, restoration of natural fire regimes would be emphasized to the extent that such natural fire regimes function at a scale and intensity that does not have a detrimental long-term effect on the function of wildlife habitats or human populations within the planning area. Old-growth juniper would be highlighted through a series of ACECs.

Historic range of variability would be used as a guide to design and implement landscape-scale treatments to produce sustainable and resilient plant communities capable of withstanding periodic outbreaks of insects, disease and fire. Western juniper would co-exists in some shrub-steppe communities, but would maintain a subordinate role and contribute to bio-diversity at the landscape level.

An estimated 70-80 percent of sites with young (less than 150 years old) juniper would be converted back into shrub-steppe or savannah communities within the next 15 years, depending on budget limitations.

In old and mature ponderosa and lodgepole forests, stand density would consist of fewer trees with a larger average diameter. There would be a lower proportion of smaller and intermediate sized ponderosa and lodgepole pine. Over time, treatments would produce a more open stand with a one or two layer canopy structure and healthy and more diverse shrub, grass, and forb understories.

Priority treatment areas in lodgepole and ponderosa pine forest would incorporate many of the priorities indicated within Alternative 2 but would treat larger units and provide management direction to expand current range toward historic range. Alternative 3 would put a greater emphasis on managing special status and non-game habitats, and less emphasis on managing for big-game habitat.

Alternative 3 would create the largest old-growth juniper woodland ACECs (see SMA section).

Alternative 3 uses special management areas and non-motorized recreation emphasis areas to focus primary management for deer, elk, sage grouse, and pronghorn.

Alternative 3 would emphasize providing terrestrial source habitats for multiple species needs across their *historic distribution*, and would increase focus on important winter range conditions for deer, elk, and sage grouse.

Alternative 3 would emphasize protecting and enhancing special status plants, old growth juniper ecosystems, historic features, and unique recreational values by designating a group of representative ACECs across the planning area.

Three new ACECs would be designated: Alfalfa Market Road, Juniper Woodland and Smith Rock.

Vegetation

Shrub-Steppe Communities
Alternative 3 would emphasize maintaining and restoring large contiguous stands of healthy, productive and diverse native shrub/steppe plant communities throughout their historic range. Restoration and expansion of key plant communities would approximate historic stand structure and geographic range as defined by conditions existing at pre-European settlement times. On most historic shrub-steppe sites, western juniper would be reduced to widely spaced old-growth trees or small patches on ridgetops or other appropriate locations where trees would contribute to biodiversity at the landscape level.

Old-Growth Juniper Woodlands
Alternative 3 would protect and promote the health and integrity of old-growth juniper woodlands/savannah throughout its historic range. In addition to the protection and maintenance of existing old-growth, treatments would also be designed to restore old-growth in selected areas where it has previously existed. Alternative 3 would designate two ACECs to protect and highlight old-growth juniper woodlands: the Juniper Woodlands ACEC (31,000 acres) and the Alfalfa Market Road ACEC (4,200 acres).

Lodgepole and Ponderosa Pine Forest
This alternative would maintain and promote healthy and diverse lodgepole and ponderosa pine forest ecosystems. Stand structure, density, species composition, patch size, pattern, and distribution would be managed to provide an environment in which fire intensity can be managed for human safety and fire effects are compatible with other management objectives. In addition, Alternative 3 would maintain or mimic natural disturbance regimes so that stands are resilient to periodic outbreaks of insects, disease, and wildfire. Ponderosa pine would be managed to maintain its dominance throughout its range by reducing competing lodgepole pine and juniper. Mature and old ponderosa pine forest structure would be re-developed in most areas within its historic range in the planning area through a series of selective thinnings, commercial harvests, and underburning.

Alternative 3 would treat the following acres annually (also see Comparison of Alternatives, Table 2-1):

Treatment Type	Year 1-5	Year 6-15	Total (15 Years)
Prescribed Fire	3,838	9,210	111,290
Mechanical	11,512	6,140	118,960
Totals	**15,350**	**15,350**	**230,250**

Wildlife

Planning Area
Alternative 3 would emphasize restoring terrestrial source habitats to provide for species needs with a focus toward biological diversity, by increasing the geographic extent of vegetation cover type and structural stages that have declined substantially from the

historical to the current period. This alternative would provide direction to re-pattern the vegetation patches so they become consistent with natural disturbance regimes and with the landform, climate, and biological and physical characteristics of the ecosystem. Representative components of naturally occurring vegetative types would be established across the planning area within the historic range of plant communities in sufficient size and frequency to serve as source habitats for species groups that are dependent upon those habitats. General wildlife habitat emphasis by geographic area is displayed in, Table 2-27, Wildlife Emphasis Areas, Alternative 3:

Geographic Areas
Alternative 3 would establish specific direction for the following geographic areas (see page 8 for a description of primary, secondary and minor wildlife emphases). Wildlife habitat emphases by geographic areas specific to species of local importance can be found in Tables 2-29 – 2-35. This alternative would manage approximately 63 percent of the planning area with a primary emphasis, 14 percent with a secondary emphasis, and 23 percent with a minor emphasis for wildlife (see Table 2-1,Comparison of Alternatives).

Hydrology

Riparian
Alternative 3 would emphasize restoring riparian habitats to support populations of well-distributed native and desired nonnative plant, vertebrate, and invertebrate populations similar to historic conditions.

Watershed/Hydrologic Function
Alternative 3 would, where the capability exists, restore, maintain and improve upland and hydrologic function through the reduction of overland flow, increased infiltration, and improved floodplain function similar to historic levels.

Table 2-27. Wildlife Emphasis Summary.

Wildlife Emphasis Areas - Alternative 3

	Primary Percent / # acres	**Secondary** Percent / # acres	**Minor** Percent / # acres	**Totals** Percent / # acres
All Wildlife Emphasis Areas	63% / 255,913 ac.	14% / 56,659 ac.	23% / 90,748 ac.	100% / 403,320 ac.
Golden Eagles	77% / 30,634 ac.	04% / 1,781 ac.	18% / 7,551 ac.	100% / 39,966 ac.
Sage grouse	97% / 75,659 ac.	03% / 1,943 ac.	0% / 0 ac.	100% / 77,602 ac.
Elk	79% / 141,707 ac.	10% / 17,513 ac.	12% / 20,948 ac.	100% / 180,168 ac.
Deer	75% / 196,450 ac.	12% / 31,896 ac.	13% / 35,160 ac.	100% / 263,506 ac.
Pronghorn	48% / 80,392 ac.	23% / 38,047 ac.	29% / 48,737 ac.	100% / 167,176 ac.
Migration and Connectivity	81% / 56,470 ac.	17% / 11,774 ac.	2% / 1,694 ac.	100% / 69,938 ac.

Table 2-28. Wildlife Emphasis Area - Alternative 3 - Mule Deer.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29590	0	0	29590
	100.00%	0.00%	0.00%	
Cline Buttes	4778	0	10489	15267
	31.30%	0.00%	68.70%	
Horse Ridge	24768	0	0	24768
	100.00%	0.00%	0.00%	
Mayfield	1588	0	0	1588
	100.00%	0.00%	0.00%	
Millican Plateau	8336	19726	24621	52683
	15.82%	37.44%	46.73%	
North Millican	53678	89	0	53767
	99.83%	0.17%	0.00%	
Prineville	1040	7775	0	8815
	11.80%	88.20%	0.00%	
Prineville Reservoir	35289	4187	0	39476
	89.39%	10.61%	0.00%	
Smith Rock	2110	0	0	2110
	100.00%	0.00%	0.00%	
South Millican	17554	0	0	17554
	100.00%	0.00%	0.00%	
Northwest	6626	119	0	6745
	98.24%	1.76%	0.00%	
Steamboat Rock	5301	0	50	5351
	99.07%	0.00%	0.93%	
Tumalo	5792	0	0	5792
	100.00%	0.00%	0.00%	
TOTAL	**196450**	**31896**	**35160**	**263506**
	74.55%	**12.10%**	**13.34%**	

Table 2-29. Wildlife Emphasis Area - Alternative 3 - Rocky Mountain Elk.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29615	0	0	29615
	100.00%	0.00%	0.00%	
	0	0	0	0
Cline Buttes	8,856	0	20,301	29,157
	30.37%	0.00%	69.63%	
Horse Ridge	5484	0	0	5484
	100.00%	0.00%	0.00%	
Lapine	30708	0	0	30708
	100.00%	0.00%	0.00%	
Mayfield	439	0	0	439
	100.00%	0.00%	0.00%	
Millican Plateau	0	15007	98	15105
	0.00%	99.35%	0.65%	
North Millican	34584	89	0	34673
	99.74%	0.26%	0.00%	
Prineville	34	905	0	939
	3.62%	96.38%	0.00%	
Prineville Reservoir	10298	1393	0	11691
	88.08%	11.92%	0.00%	
Smith Rock	0	0	0	0
	0	0	0	
South Millican	4834	0	0	4834
	100.00%	0.00%	0.00%	
Northwest	6626	119	0	6745
	98.24%	1.76%	0.00%	
Steamboat Rock	4421	0	549	4970
	88.95%	0.00%	11.05%	
Tumalo	5808	0	0	5808
	100.00%	0.00%	0.00%	
TOTAL	**141,707**	**17,513**	**20,948**	**180168**
	78.65%	**9.72%**	**11.63%**	

Table 2-30. Wildlife Emphasis Area - Alternative 3 - Golden Eagle.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	0	0	0	0
	0	0	0	
Bend/Redmond	0	0	128	128
	0.00%	0.00%	100.00%	
Cline Buttes	3,455	0	1,949	5,404
	63.93%	0.00%	36.07%	
Horse Ridge	2158	0	1	2159
	99.95%	0.00%	0.05%	
Lapine	0	0	0	0
	0	0	0	
Mayfield	0	0	0	0
	0	0	0	
Millican Plateau	3714	672	5119	9505
	39.07%	7.07%	53.86%	
North Millican	4812	48	0	4860
	99.01%	0.99%	0.00%	
Prineville	868	1061	0	1929
	45.00%	55.00%	0.00%	
Prineville Reservoir	7061	0	0	7061
	100.00%	0.00%	0.00%	
Smith Rock	997	0	0	997
	100.00%	0.00%	0.00%	
South Millican	513	0	0	513
	100.00%	0.00%	0.00%	
Northwest	1038	0	0	1038
	100.00%	0.00%	0.00%	
Steamboat Rock	3950	0	354	4304
	91.78%	0.00%	8.22%	
Tumalo	2068	0	0	2068
	100.00%	0.00%	0.00%	
TOTAL	**30,634**	**1,781**	**7,551**	**39966**
	76.65%	**4.46%**	**18.89%**	

Table 2-31. Wildlife Emphasis Area - Alternative 3 - Pronghorn.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	9378	0	0	9378
	100.00%	0.00%	0.00%	
Bend/Redmond	0	4144	21802	25946
	0.00%	15.97%	84.03%	
Horse Ridge	19384	0	0	19384
	100.00%	0.00%	0.00%	
Mayfield	5563	19123	3	24689
	22.53%	77.46%	0.01%	
Millican Plateau	3810	10493	26932	41235
	9.24%	25.45%	65.31%	
North Millican	24520	0	0	24520
	100.00%	0.00%	0.00%	
Prineville	396	2735	0	3131
	12.65%	87.35%	0.00%	
Prineville Reservoir	0	1552	0	1552
	0.00%	100.00%	0.00%	
Smith Rock	0	0	0	0
	0	0	0	
South Millican	17341	0	0	17341
	100.00%	0.00%	0.00%	
Northwest	0	0	0	0
	0	0	0	
Steamboat Rock	0	0	0	0
	0	0	0	
Tumalo	0	0	0	0
	0	0	0	
TOTAL	**80392**	**38047**	**48737**	**167176**
	48.09%	**22.76%**	**29.15%**	

Table 2-32. Wildlife Emphasis Area - Alternative 3 - Sage Grouse.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	0	0	0	0
	0	0	0.00%	
Cline Buttes	0	0	0	0
	0	0	0	
Horse Ridge	14356	0	0	14356
	100.00%	0.00%	0.00%	
Mayfield	0	0	0	0
	0	0	0	
Millican Plateau	0	1943	0	1943
	0.00%	100.00%	0.00%	
North Millican	44413	0	0	44413
	100.00%	0.00%	0.00%	
Prineville	0	0	0	0
	0	0	0	
Prineville Reservoir	19	0	0	19
	100.00%	0.00%	0.00%	
Smith Rock	0	0	0	0
	0	0	0	
South Millican	16871	0	0	16871
	100.00%	0.00%	0.00%	
Northwest	0	0	0	0
	0	0	0	
Steamboat Rock	0	0	0	0
	0	0	0	
Tumalo	0	0	0	0
	0	0	0	
TOTAL	**75659**	**1943**	**0**	**77602**
	97.50%	**2.50%**	**0.00%**	

Table 2-33. Wildlife Emphasis Area - Alternative 3 - Migration and Connectivity Corridors.

Geographical Area	Species	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
La Pine	Deer	38979	0	1664	40643
		96%	0%	4%	
Badlands	Pronghorn	1790	0	0	1790
		100%	0%	0%	
Mayfield Pond	Pronghorn	3396.2	1515.2	0	4911.4
		69%	31%	0%	
Millican Plateau	Pronghorn	1115.5	8708.3	30.6	9854.4
		11%	88%	0%	
North Millican	Pronghorn	3950	89	0	4039
		98%	2%	0%	
Research Natural Area	Pronghorn	510.2	0	0	510.2
		100%	0%	0%	
Subtotals for Pronghorn		**10761.9**	**10312.5**	**30.6**	**21105**
		51%	**49%**	**0%**	
Prineville	Elk	0	67.5	0	67.5
		0%	100%	0%	
Prineville Reservoir	Elk	6729	1393.6	0	8122.6
		83%	17%	0%	
Subtotals for Elk		**6729**	**1461.1**	**0**	**8190.1**
		82%	**18%**	**0%**	
TOTAL		**56469.9**	**11773.6**	**1694.6**	**69938.1**
		81%	**17%**	**2%**	

Table 2-34. Wildlife Emphasis Area - Alternative 3 - All Species' Habitats.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29616	0	0	29616
	100.00%	0.00%	0.00%	
Bend/Redmond	1366	4146	36632	42144
	3.24%	9.84%	86.92%	
Cline Buttes	11563	0	20301	31864
	36.29%	0.00%	63.71%	
Horse Ridge	25167	0	0	25167
	100.00%	0.00%	0.00%	
Lapine Connect.	39526	0	1664	41190
	95.96%	0.00%	4.04%	
Mayfield	7546	19458	4	27008
	27.94%	72.05%	0.01%	
Millican Plateau	9548	19730	27007	56285
	16.96%	35.05%	47.98%	
North Millican	54164	89	0	54253
	99.84%	0.16%	0.00%	
Prineville	2931	8930	0	11861
	24.71%	75.29%	0.00%	
Prineville Reservoir	35289	4187	0	39476
	89.39%	10.61%	0.00%	
Smith Rock	2119	0	0	2119
	100.00%	0.00%	0.00%	
South Millican	17687	0	0	17687
	100.00%	0.00%	0.00%	
Northwest	6626	119	0	6745
	98.24%	1.76%	0.00%	
Steamboat Rock	6957	0	5140	12097
	57.51%	0.00%	42.49%	
Tumalo	5808	0	0	5808
	100.00%	0.00%	0.00%	
TOTAL	**255913**	**56659**	**90748**	**403320**
	63.45%	**14.05%**	**22.50%**	

Special Management Areas

Areas of Critical Environmental Concern (ACECs)

Three new ACECs would be designated: Alfalfa Market Road, Juniper Woodland, and Smith Rock (see Map 7). The acres designated as ACEC (existing and new) total 60,192 under Alternative 3.

Badlands ACEC
In addition to management direction for the larger WSA applied to all alternatives, under Alternative 3, the following guidelines apply:
1. The ACEC is closed to motorized use year-round;
2. The ACEC is closed to firearm discharge unless legally hunting (see also Recreation, Badlands – Common to All, and Recreation , Badlands – Alternative 3).

Alfalfa Market Road ACEC
Alternative 3 would protect and/or promote the health and integrity of the old growth juniper woodland ecosystem and its associated wildlife and recreational values on approximately 4,200 acres.

Vegetation and wildlife habitat management projects would be an integral part of ACEC management and would be designed to maintain or enhance the ACEC values.

Restoration/improvement of native plant communities, old-growth juniper woodlands, and habitat for raptors, neotropical birds and threatened, endangered or other special status plants and animals would be emphasized. Long-term vegetation maintenance would be designed to emulate natural processes and return historic diversities.

Livestock grazing would be allowed if it was consistent with ACEC goals and in accordance with Standards for Rangeland Health and Guidelines for Grazing Management. Mineral material sales, development of mining claims, and geophysical exploration would be restricted to protect the values of this ACEC. Plans of operation would be submitted and approved by the BLM prior to any issuance of free use permits or sales contracts or prior to the development of mining claims. Approved plans of operation would have stipulations to protect the values of the ACEC. Surface occupancy for fluid mineral leasing would not be allowed. After the permanent BLM road network would be established and implemented, new roads would only be considered if they replace a similar mileage of existing road. Decommissioned roads would be obliterated and rehabilitated unless a compatible use is identified such as converting a road to a trail or preserving a historic route.

Rockhounding would not be allowed. The ACEC would be closed to firearm discharge unless hunting.

Juniper Woodland ACEC
Alternative 3 would provide direction to protect and/or promote the health and integrity of the old growth juniper woodland ecosystem and its associated wildlife, special status plant (Peck's milkvetch), historical (Tumalo Canals) and recreational values. Approximately 31,000 acres would be designated.

The ACEC would be within Land Tenure Zone 2, which would allow adjustments, provided there is no net loss of acreage within the ACEC and the management goals could still be attained. Acquired lands within the ACEC would be added to the ACEC designation. Livestock grazing would generally be allowed if consistent with ACEC goals and in accordance with Standards for Rangeland Health and Guidelines for Grazing Management. Non-motorized recreation would be emphasized in the area west of the Cline Falls Highway and east of Barr Road. Interpretive trails would be developed.

Small developments, such as picnic areas at trailheads and/or interpretive areas, would be developed as needed. After the permanent BLM road network is established and implemented, new roads would only be considered if they replace a similar mileage of existing road. This area would be an avoidance area for new rights-of-way. Decommissioned roads would be obliterated and rehabilitated unless a compatible use is identified such as converting a road to a trail or preserving a historic route.

Vegetation and wildlife habitat management projects would be an integral part of ACEC management and would be designed to maintain or enhance the ACEC values by restoring/improving native plant communities, old-growth juniper woodlands, and habitat for raptors, neo-tropical birds and threatened, endangered or other special status plants and animals. Long-term vegetation maintenance would be designed to emulate natural processes.

Mineral material sales, development of mining claims, and geophysical exploration would be restricted to protect the values of this ACEC. Plans of operation would be submitted and approved by the BLM prior to any issuance of free use permits or sales contracts or prior to the development of mining claims (see Common to Alternatives 2 – 7 for further detail). The portion of the ACEC that includes the Maston Allotment and that is east of the Cline Falls Highway would be closed to firearm discharge unless hunting.

Smith Rock ACEC
Alternative 3 would designate a 2,120-acre area adjacent to Smith Rock State Park to provide high scenic quality and dispersed recreation.

Livestock grazing would generally be allowed if consistent with ACEC goals and in accordance with Standards for Rangeland Health and Guidelines for Grazing Management. Vegetation and wildlife habitat management projects would be designed to maintain or enhance the ACEC values. Long-term vegetation maintenance would be designed to emulate natural processes.

Mineral material sales and surface occupancy for fluid mineral leasing would not be allowed. Plans of operation would be submitted and approved by the BLM prior to any development of mining claims. Approved plans of operation would have stipulations to protect the values of this ACEC. Geophysical exploration would also be restricted to protect the natural values for which this ACEC was designated. New rights-of-way would not be considered. Rockhounding would be restricted to surface collection only. No person would be allowed to dig, excavate or otherwise remove soil to explore for, discover, or remove rock materials. Firearm discharge would not be allowed unless hunting.

Caves

In Alternative 3, all significant caves and caves nominated for significance (with the exception of Redmond Caves) would be closed under the "Federal Cave Resources Protection Act" until a site management plan is developed that manages wildlife resources with a primary emphasis. Pictograph Cave would be closed except for interpretive use under permit.

Land Uses

Alternative 3 would emphasize managing for a low conflict between land uses and wildlife use, while allowing up to high conflicts of land uses with adjacent private land uses, and between other uses/users of public land. Alternative 3 would also emphasize resolving conflicts with land uses individually, as is currently practiced.

Livestock Grazing

In this alternative (as in Alternatives 2 - 7), the BLM would use a formula to estimate potential for conflict and demand to help identify where problems are likely to occur. This alternative does not include any management changes to reduce conflicts, other than those already listed in CTA and CT2-7. Livestock grazing would continue to be allowed regardless of level of conflict or demand.

Minerals

Minerals conflicts would be managed with an emphasis on mitigating mining conflicts with ecosystem and wildlife habitat management objectives in important wildlife habitats. Mining conflicts with recreation and residents would be mitigated as in Alternative 2.

Under this alternative, approximately 332,775 acres would be available for mineral material sales. Seasonal restrictions on all mineral operations would apply to 88,994 acres and surface occupancy for fluid mineral leasing would not be allowed on 75,481 acres. Mineral material sales sites may not be located within 1/8 mile of residentially zoned areas or designated recreation sites. Roads that feed from BLM-administered lands into residentially zoned areas may be used for mining-related traffic only if alternate routes are not available (see Map S-24, Minerals Alternative 3).

Forest Products

Harvest of commercial timber and firewood would occur in conjunction with larger-scale vegetative treatments that incorporate thinning dense timber stands and removing small diameter trees.

More intensive thinning of small diameter lodgepole pine in Alternative 3 would provide a slightly higher yield of forest products than under Alternative 2. Actual rate of thinning in overstocked lodgepole and ponderosa pine stands would be constrained by budget limitations. Priority treatments that could produce commercial forest products would be based on restoration of historic structure and range of ponderosa pine and vegetative treatment objectives for fuels, forest health and wildlife habitat. Thinning from below and removal of competing lodgepole pine and juniper would be emphasized (see Table 2-1, Comparison of Alternatives, for forest product volumes produced under each alternative).

Military Uses

Alternative 3 would provide for a historically consistent level of military training area in the smallest possible area, overlapping training within the same area.

The area permitted for military use would be approximately 21,094 acres. The training area permitted in this alternative would be south of Highway 126, crossing Powell Buttes Highway. The permitted area would be east of the Roberts Field and North Unit Canal and north of BLM road 6589-B. The permitted area would be west of the private land ownership in the rural community of Powell Buttes. The old clay pit north of Highway 126 would also be included. The area described is the same as the No Action Alternative minus all lands west of the North Unit Canal up to the lands adjacent to the east boundary of the airport.

Recreation

The recreation emphasis varies by area in Alternative 3. The largest percentage (39 percent) of the planning area is still managed for multiple use on shared road and trail

facilities (the Bend/Redmond block and Millican Valley). About 20 percent of the area is managed exclusively for non-motorized recreation use (a portion of Cline Buttes, Badlands WSA, Alfalfa ACEC, Tumalo block, and the lower Crooked River), while about 16 percent of the area is managed with an emphasis on motorized use only on roads, with trails provided for non-motorized use (Mayfield, Horse Ridge, and Skeleton Fire areas). The largest blocks of land closed to motor vehicles and managed for non-motorized trail use include the Badlands WSA and an area on both sides of the Chimney Rock segment of the lower Crooked River. Cline Buttes and Steamboat Rock blocks would have intensive management for multiple use on separated road or trail systems. About 18 percent of the area is Closed to motorized use year-round; only Alternative 6 closed more acreage than this. About 22 percent of the area has seasonal restrictions on motorized use, which is about in the middle of the range of alternatives; however, this alternative does close an additional portion of Millican Valley under heavier snow conditions. During seasonal closure periods in the Millican Valley, motorized use would be managed on designated trails in the Millican Plateau, as well as in the Bend/Redmond block and on separate trail systems in a portion of Cline Buttes (see Map 17, Recreation Emphasis – Alternative 3).

Geographic Areas

Badlands

Alternative 3 would move the area's management more toward a primitive, non-motorized recreation experience, with the entire area designated Closed to motor vehicles, except for administrative use. Mechanized use (e.g., mountain bikes, horse drawn carts) would be allowed on designated, inventoried routes. Designated parking and trailhead improvements would be a high priority under this alternative, in order to provide adequate parking for vehicles and trailers that currently park in dispersed locations within the WSA.

The Badlands WSA would be closed to all motorized vehicle use, except administrative use (including patrols and Interim Management Plan monitoring).

Bend/Redmond

Alternative 3 provides a similar level of management as Alternative 2; however, this Alternative identifies the area north of State Highway 126 as having a lower trail density than in Alternative 2. This alternative also places more emphasis than Alternative 2 on moving trails away from existing subdivisions to the extent feasible. While the area's management changes from an Open to a Limited designation, all recreation users are expected to share the same trails (with the exception of a possible North Unit Canal regional trail and trails within the fenced portion of the Wagon Roads ACEC. Select roads of historic and cultural value may be removed from the designated road system. Site improvement goals would include staging areas, an OHV play area, additional trail bridge crossings of the north unit canal, and grade separated crossings of State Highway 126, Powell Butte Highway, and other new arterials or highways rights-of-way roads.

Cline Buttes

Recreational users in Cline Buttes would be segregated under Alternative 3 to minimize conflicts to a significant degree. Motorized use would be managed with an emphasis on designated roads. The Maston Allotment would be managed for primitive, non-motorized recreation experiences, and many areas in Cline Buttes emphasize designation of non-motorized trails, including the upper portions of the Buttes, the historic canals, and the canyon areas.

The main block south of State Highway 126 and generally west of Barr Road would be designated as Limited to designated roads and trails. Except:
The canyon complex east of Fryrear Road and south of State Highway 126 would be closed to motorized travel.

The area north of State Highway 126 would be designated as Limited to designated roads and trails.
The area east of Cline Falls Highway (Maston Allotment) and the area east of Barr Road, west of Cline Falls Highway, and south of the access road to the Cline Buttes gravel pit (Cline Buttes Old Growth Juniper ACEC) would be designated as Closed to motor vehicles.

Horse Ridge
Under this alternative, the management focus for the Skeleton Fire area and Horse Ridge would be on non-motorized trail use on designated trails. Designated roads would be present in these areas, but at a low density and layout similar to what is currently available. Existing two-track roads that are currently closed to motorized use would be considered for inclusion as part of a designated, signed, non-motorized trail system.

La Pine
Under Alternative 3, motorized use would be Limited to a designated road system. Some designated OHV trail connections could be developed from the Rosland OHV play area east to the Deschutes National Forest.

The La Pine block would be managed as Limited to designated roads only, except (see Map 10) the area surrounding and east of the Rosland OHV Play area would be Limited to designated roads and trails. In addition, isolated public land blocks within the La Pine area would be managed as Closed to motor vehicles. These blocks generally range from 40 to 500 acres in size.

Mayfield
Motorized vehicle use in the main block of public lands north of Alfalfa Market Road and south of Powell Butte Highway would be Limited to designated roads only, with most of the road use occurring in the northern half of the block. Future motorized access points would likely be provided at Alfalfa Market Road and Powell Butte Highway. A signed trail system would be established in the block for equestrian/non-motorized use. The road to Mayfield Pond would be rerouted further away from the pond or would end at a parking area prior to the pond. The area south of Alfalfa Market Road (Alfalfa ACEC) would be to motor vehicle use year-round, and would be managed for recreation use on a designated trail system, which includes closed roads, roads converted to trails, and new trail construction.

The main block between Alfalfa Market Road and Powell Butte Highway would be designated as Limited to designated roads only. The Alfalfa ACEC and the area outside of the Alfalfa ACEC boundary and west of Dodds Road would be designated as Closed to motor vehicles. The area east of Dodds Road would be Limited to designated roads only in order to allow continued access to Reynolds Pond.

Millican Plateau
The area would be managed for OHV use on designated roads and trails, similar to the present management (Alternative 1). The area north of Kitchen Hill and south of Reservoir Road would be managed for year round use on designated roads and trails, except under conditions of heavy snowfall, as specified in the Final Judgment for the Millican Valley Plan. This area would be Closed to OHV use during the period between December 1 and April 30 when snow depths exceed specified depths.

Snow depth would be measured at the current designated measurement locations and averaged. If the applicable snow depth is exceeded, the area shall be posted closed at kiosks with 48 hours and remain closed until the snow depth falls below the applicable amount.

Motorized Closure Guide:

TIME PERIOD	SNOW DEPTH (INCHES)
Dec. 1 – Dec. 14	6.8
Dec. 15-Dec. 31	9.1
Jan. 1 – Jan. 14	11.0
Jan. 15 – Jan. 3	12.7
Feb. 1 – Feb. 14	14.4
Feb. 15 – Feb. 29	11.9
Mar. 1 – Mar. 14	9.3
Mar. 15 – Mar. 31	7.0
April 1 – April 14	4.2
April 15 – April 30	2.2

The area east of Road 6555-b and west of the Crooked River would be designated Closed to motor vehicles. Off highway motorized vehicle use would be managed to provide visitor satisfaction, protect natural resources, provide visitor safety, and minimize conflicts among various users and neighbors.

North Millican Area
Alternative 3 manages the area for shared use, with a small portion of the area located adjacent to the Badlands WSA emphasizing non-motorized trails. The entire area would be open to motorized use from May 1 thru November 30. The alternative would establish improved trailheads, and a group use area at the base of Dry Canyon, which would replace the dispersed parking and camping presently occurring in the area. Many of the improvements established in the Millican Valley Plan would be implemented.
This area would be limited to designated roads and trails and motorized travel would be limited to May 1 thru November 30.

Northwest
The area would be managed with an emphasis on non-motorized recreation, with motorized use being Limited to designated roads only in the main block, while the scattered parcels west of Squaw Creek are Closed to motorized use. A seasonal restriction on motorized use would be in place, consistent with adjacent policy on the Crooked River National Grasslands (CRNG); however, the area remains open year-round for non-motorized use. Non-motorized trails and additional trailheads to serve them are provided.

Motorized travel in main block limited to designated roads and Limited to April 1 through November 30. Isolated parcels west of Squaw Creek would be Closed to motorized travel, except for Sisters Climbing Area.

Prineville Reservoir
The area would be managed primarily for motorized use on a Limited designated road system, with non-motorized trails developed adjacent to the Crooked River and Prineville Reservoir. The area between the County Boat Ramp and the Chimney Rock Trail on the Crooked River would be managed for non-motorized use only. The northeastern portion of the area (the Sanford Creek drainage) would be managed for little motorized access, with designated roads only open seasonally. The remainder of the area including lands on either side of the Bear Creek arm of Prineville Reservoir would be limited to designated roads only year-round. These BLM lands would have designated, non-motorized trails that link to BOR/State Park managed sites at Prineville Reservoir.

This alternative would remain the same as Alternative 2, except the area north of upper Portion of Prineville Reservoir is designated Limited to designated roads and motorized travel would be limited to May 1 thru November 30. The area between the County

Boat Ramp and Chimney Rock Trail would be Closed to motor vehicles. In addition, motorized travel would be Limited to designated roads (Taylor Butte travel is limited under Common to Alternatives 2 - 7), except within the Sanford Creek area, where motorized travel would be Limited to designated roads and OHV use would be limited to May 1 thru November 30.

Smith Rock
Alternative 3, like all alternatives, closes the entire block to motorized vehicles. This alternative does not allow for additional trail development for non-motorized trail use, other than trail rerouting to solve resource or user safety problems at climbing areas. The designated trail link from Smith Rock State Park to the Grey Butte Trail would be maintained.

South Millican Area
The South Millican Area remains open to motorized use on designated roads and trails but would be closed seasonally to OHV use from December 1 to July 31. Connections to North Millican and National Forest trails systems could be developed in the future. South Millican OHV area and Fox Butte Area are Limited to designated roads and trails, and motorized use would be limited to August 1 thru November 30.

Steamboat Rock
The main Steamboat Rock area would be Limited to designated roads and to Class I and III OHVs only (no full size vehicles) in an effort to reduce conflicts between residential areas and public land visitors and to reduce illegal dumping prevalent in the area. The number of access points would be reduced, and new roads would be created to link existing roads back to common access points or trailheads. A separate trail system for non-motorized use would be developed. Signs and public information would be put in place to maximize user compliance on trail system regulations. The river parcels adjacent to Crooked River Ranch would continue to be managed to emphasize non-motorized use. Isolated parcels northwest of Redmond are managed exclusively for non-motorized use, with improvements to allow access to the middle Deschutes River while minimizing conflicts with landowners.

The main block would be managed as Limited to designated roads only, and limited to Class I and III OHVs only (no full size vehicles).

Tumalo
The Tumalo Block would be Closed to motorized use year-round, and the recreation management emphasis would be on providing non-motorized opportunities (hiking, mountain biking, and equestrian use) on designated trails year-round. Designated, improved, and managed parking areas and trailheads would be developed. A designated, non-motorized trail system would be developed and signed in both larger parcels north and south of Tumalo Reservoir. In order to control motor vehicle access into the parcels, the boundaries are fenced. Unlike other alternatives that stress non-motorized trail development, this alternative explicitly calls for no development of regional trails through the area.

The entire area would be Closed to motorized use.

Transportation and Utilities

The emphasis for Alternatives 3-7 is to designate an integrated regional and local transportation system that would minimize the total amount of land committed to transportation systems and improve the efficiency of the resulting system to meet multiple-agency needs. Alternatives 3-7 would allocate a reduced area for a regional

transportation corridor, connecting with an interchange at Quarry Road on Highway 97 rather than extending south to Deschutes Junction. Alternatives 3-7 do not vary in the amount and location of collector or local roads available for future designation or closure.

Regional Transportation

Alternative 3 would designate a transportation corridor between south Redmond to connect with an interchange at or around Quarry Road. There would be no additional transportation corridor allocated between Bend and Redmond. Alternative 3 would likely require relinquishment of about 10 miles of existing historical road in the Bend-Redmond block at the time the right-of-way grant is issued.

Local Transportation

Alternatives 3-7 would all designate a similar local transportation system. Roads not under BLM jurisdiction would continue to form the backbone of the collector system, except where we can reasonably anticipate modification of existing rights-of-way. Alternative 3 identifies about 63 percent of the planning area in a primary wildlife emphasis designation and 36 percent in either a non-motorized emphasis or non-motorized exclusive designation. The recreation designations may or may not be included in the primary wildlife emphasis designation (see the Recreation and Wildlife Emphasis maps for specific locations).

Right-of-Way Corridors

Alternatives 3-7 would designate the road network and transportation/utility corridors as shown on Map 3, and allocate a transportation/utility corridor adjacent to the Burlington Northern/Santa Fe railroad right-of-way approximately ½ mile wide south of Redmond, extending to Quarry Road.

Land Ownership

Alternative 3 would strongly emphasize retention of public lands in the current arrangement, with some allowance for sale or exchange to enhance wildlife habitat and connectivity, or development of open spaces and greenways that enhance urban or transitional recreational opportunities. Community Expansion (zoned CE) would be limited to parks, greenways, open spaces, or the creation of buffers between source habitats for wildlife and urban population centers. This alternative would maintain or create large consolidated blocks, primarily to protect and improve the best ecological areas and provide connectivity for the passage of wildlife.

This alternative would designate the lands in Map 32 as Z-1 (approximately 358,841 acres). Blocks of public lands identified as Z-1 include Tumalo, Cline Buttes, Bend/Redmond Core, Smith Rocks, Mayfield, Badlands, Horse Ridge, Reservoir East, Reservoir West, Southeast, Highway, and the majority of public lands in La Pine north and south of the community. Other, smaller parcels of public land identified include Grizzly Mountain, Ochoco Reservoir, and Redmond Caves.

Under this alternative, parcels totaling approximately 33,556 acres would be identified that are generally to retain, but may be disposed of through exchange for lands with higher public values (Zone 2).

Approximately 7,889 acres would be designated to as suitable for disposal (Zone Z3). These lands generally do not provide substantial resource, public, or tribal benefits; may not be cost effective for the BLM to manage; or would represent a greater public benefit in other ownership. Parcels identified as suitable for disposal (Z-3) include isolated

parcels between Bend and Redmond, two isolated parcels northwest of Redmond, and isolated parcels around Prineville.

Approximately 3,121 acres would be designated for community expansion to provide transition zones between highly developed urban areas and large blocks of primarily undeveloped natural landscapes. Public lands identified for community expansion (zoned CE) for parks and transportation corridors with compatible facilities are located south of Redmond and east of Highway 97 and adjacent to the Burlington Northern and Santa Fe railroad tracks. Parcels identified for community expansion (zoned CE) for park purposes only are Barnes Butte northeast of Prineville; and public lands adjacent to the north, east, and south boundaries of the community of La Pine.

Alternative 3 emphasize the lands for acquisition that would protect and improve the best ecological areas and provide for the passage of wildlife; to provide access to public lands; and to increase the spectrum of recreation opportunities. Parcels of interest include those between Northwest and Cline Buttes, Smith Rock and Bend/Redmond, Tumalo and Cline Buttes, Bend/Redmond and Cline Buttes, and Mayfield and the Badlands.

Public Health and Safety

Of any alternative, Alternative 3 would close the most acreage to some type of firearm discharge (32% of the planning area); however, most BLM land in the planning area would still be available for hunting (98%). Areas of emphasis would include the Badlands area, Steamboat Rock, and the Tumalo block to improve recreation experiences, and protect sensitive resources (see Tables 2-35a and 2-35b for areas closed to all firearm discharge and areas closed to firearm discharge unless legally hunting).

Table 2-35a: Closed to all firearm discharge

Cline Buttes	Tumalo Canal ACEC
Tumalo Block	700-acre parcel south of Tumalo Reservoir Road
Bend Redmond Block	BLM land southwest of McGrath Road including Historic Roads ACEC
Mayfield Block	Airport parcel
Horse Ridge Block	North of Rickard Road, South of Hwy. 20

Table 2-35b: Closed to firearm discharge unless legally hunting

Cline Buttes	Maston Allotment
Tumalo Block	Entire block expect for the 700-acre parcel south of Tumalo Reservoir Road
Steamboat Rock Block	All BLM land south of Lower Bridge Road outside of the WSR corridor
Mayfield Block	Alfalfa ACEC and adjacent lands to the southeast
Horse Ridge Block	BLM land between new and old Highway 20
Northwest Block	All BLM land not closed to all firearm discharge CT Alts 2 - 7
Badlands Block	Entire Badlands Block except ¼ mile around Badlands Rock from March 1 to August 31
Prineville Reservoir Block	BLM lands contiguous and east of Lower Crooked WSR and contiguous and west of BOR/Prineville Reservoir
Millican Plateau Block	BLM lands contiguous and west of the Lower Crooked WSR, and east of Road 6665
La Pine Block	Entire block except for parcels closed to all firearm discharge CT Alts 2-7

Alternative 4

Alternative 4 would provide for ecosystem health and diversity by focusing efforts on maintenance and restoration of current conditions as described under the Key Concepts, and would anticipate lower amounts of treatment acres, especially prescribed fire acres, than alternatives with an historic emphasis. Alternatives 2, 4, and 5 would have this same emphasis. Alternative 4 would increase the amount of primary and secondary wildlife habitat emphasis in the planning area from current direction to about 50 percent of the planning area.[27] There would be no additional management direction over that Common to Alternatives 2 - 7 for riparian areas or water quality or quantity, but Alternative 4 would include a change in Special Management Areas. This alternative would include designation of two new Old Growth Juniper Woodlands ACECs in the Cline Buttes and Mayfield geographic areas to focus research, interpretation, and management of the unique Central Oregon old growth juniper ecosystems. The Juniper Woodlands ACEC would incorporate the Peck's Milkvetch (CTA) and Tumalo Canals (CT 2-7) ACECs, but would be about 800 acres smaller than the proposed ACEC under Alternative 3. This alternative would also include designation of a scenic ACEC for the Smith Rock area. Alternative 4 would also include designation of a Sage Grouse ACEC to focus special management attention on the breeding and wintering area near Millican. This alternative has the second most acreage in Special Management Area designations of the alternatives.

There would be a reduction of areas available for livestock grazing under Alternative 4 over those identified in Alternatives 1, 2 and 3 of about 40,000 acres. This would reduce available AUMs by about nine percent. There would be fewer acres available for mineral sales over those identified as common to Alternatives 2 - 7, by about 20,000 acres. New ACEC designations indicate a greater potential for increased cost or limited availability of mineral materials within those areas, but do not prohibit specific development. Estimated forest or range products are based on the expected amount of treatment acres (in addition to the Wildland-urban interface (WUI) treatments identified as Common to Alternatives 2 - 7), and are expected to be at about 120,000 cubic feet (600,000 board feet) for Alternatives 2, 4, or 5, lower than that available under alternatives 3, 6, or 7. Alternative 4 would provide an increase in the area available for permanent long-term military use over Alternative 3 of about 5,000 acres, less than Alternative 2, and about the same total area as the current use area.

The recreation emphasis in Alternative 4 would increase the amount of multi-use shared facilities compared to Alternative 3 to just over half the planning area, but would have more of an emphasis on managing separated use areas than either Alternatives 1 or 2. None of the areas would emphasize designation of separate facilities in the same geographic area. Areas managed exclusively for or with a non-motorized emphasis for trails would be increased over Alternative 1 from 3 percent to about 39 percent, with a greater emphasis on non-motorized emphasis areas (which provide motorized use on roads, non-motorized on trails) than on exclusive non-motorized use. About 93 percent of the geographic areas would emphasize recreation on designated motorized roads or roads and trails, with about 77 percent of the area available for motorized use on designated roads and trails during the winter use season.

Alternative 4 has slightly less land designated for retention (Z-1) than Alternatives 2 or 3. Alternative 4 has nearly the same amount of lands available for retention with the possibility of exchange (Z-2) as Alternative 2, in different configurations, but less still substantially less than Alternative 1. The total amount of land classified for disposal (Z-

[27] For this comparison, areas designated as critical habitat in the Brothers - La Pine Resource Management Plan or as a result of other cooperative designations like winter closure areas were assumed to reflect a "primary" designation as used by the Upper Deschutes RMP.

3) is roughly the same as Alternative 2, at about 3% of the planning area. Lands classified as Community Expansion (CE) lands are reduced from both Alternatives 1 and 2, include limitations on uses for future community expansion lands to greenbelts and open space, and limitations on exchanges in certain areas to maintain or restore consolidated ownership and habitat values in or between large blocks of public lands.

Designated transportation systems are altered over those in Alternative 1 and 2 by the addition of a transportation corridor south of Redmond to Deschutes Junction that would include a connection to Highway 97 near Quarry Road. This configuration would be the same for Alternatives 4-7. As in Alternative 3, this alternative would designate existing roads to serve as future collectors in the BLM system. By changing the designation of some existing collector roads to local roads, additional roads fall into a category that would make them available either for future designation or closure, depending upon resource conditions and demands. Alternative 4 would anticipate future local road densities lower or seasonally restricted in areas of high wildlife emphasis, or areas designated for non-motorized emphasis. In accordance with elements common to Alternatives 2 - 7, designation of a new transportation corridor would anticipate future relinquishment of a similar amount of historic roads in the Bend-Redmond geographic area.

Alternative 4 would close identical areas to all firearm discharge as Alternative 3, but would dramatically reduce the acreage closed to firearm discharge unless legally hunting (from 30% to 6%). Remaining closures would emphasize management in the Steamboat Rock and Northwest blocks.

Ecosystem Health and Diversity

Alternative 4 would emphasize restoring native plant and animal populations to their "historic" distribution on BLM-administered lands. This would include a strong emphasis on restoring grass and shrub communities where western juniper has expanded its historic range or density throughout the planning area, and also emphasize management for more diverse native animal populations, with less of an emphasis on providing suitable cover habitats for deer and elk outside of the historic range of plant communities that may provide those attributes. Outside of the WUI, restoration of natural fire regimes would be emphasized to the extent that such natural fire regimes function at a scale and intensity that does not have a detrimental long-term effect on the function of wildlife habitats or human populations within the planning area. Old-growth juniper would be highlighted through a series of ACECs.

Historic range of variability would be used as a guide to design and implement landscape-scale treatments to produce sustainable and resilient plant communities capable of withstanding periodic outbreaks of insects, disease and fire. Western juniper would co-exists in some shrub-steppe communities, but would maintain a subordinate role and contribute to bio-diversity at the landscape level.

An estimated 70-80 percent of sites with young (less than 150 years old) juniper would be converted back into shrub-steppe or savannah communities within the next 15 years, depending on budget limitations.

In old and mature ponderosa and lodgepole forests, stand density would consist of fewer trees with a larger average diameter. There would be a lower proportion of smaller and intermediate sized ponderosa and lodgepole pine. Over time, treatments would produce a more open stand with a one or two layer canopy structure and healthy and more diverse shrub, grass, and forb understories.

Priority treatment areas in lodgepole and ponderosa pine forest would incorporate many of the priorities indicated within Alternative 2 but would treat larger units and provide

management direction to expand current range toward historic range. Alternative 4 would put a greater emphasis on managing special status and non-game habitats, and less emphasis on managing for big-game habitat.

Alternative 4 would provide for protection of important and unique natural resources by designating ACECs similar to Alternative 3, but with a difference in size and resources emphasized. This alternative would generally allow for more mixed uses within ACECs. Acres designated ACEC (existing and new) total 50,075 under this alternative.

Vegetation

Management in Alternative 4 would be the same as Alternative 3, except there would be no designations of ACECs specifically for old-growth juniper woodlands.

Wildlife

Planning Area
Alternative 4 would emphasize restoring terrestrial source habitats to provide for multiple species needs and maintain important conditions for deer and elk (see Table 2-36, Wildlife Emphasis Summary, Alternative 4). By restoring vegetation cover types in their current distribution and restoring their structural stages that have declined substantially from the historical to the current period the planning area would be re-patterned so that the vegetation patches are more consistent with disturbance regimes and with the landform, climate, and biological and physical characteristics of the ecosystem. This alternative would also provide management direction to maintain or improve habitats to support healthy, productive and diverse populations and communities of native plants and animals (including species of local importance).

Table 2-36:

Wildlife Emphasis Areas - Alternative 4

	Primary Percent / # acres	**Secondary** Percent / # acres	**Minor** Percent / # acres	**Totals** Percent / # acres
All Wildlife Emphasis Areas	39% / 158,057 ac.	08% / 30,878 ac.	53% / 214,367 ac.	100% / 403,302 ac.
Golden Eagles	59% / 23,659 ac.	10% / 3,862 ac.	31% / 12,445 ac.	100% / 39,966 ac.
Sage grouse	41% / 31,622 ac.	19% / 15,097 ac.	40% / 30,881 ac.	100% / 77,600 ac.
Elk	38% / 70,311 ac.	08% / 13,780 ac.	54% / 99,031 ac.	100% / 183,122 ac.
Deer	51% / 136,922 ac.	10% / 25,976 ac.	38% / 100,607 ac.	100% / 263,505 ac.
Pronghorn	35% / 57,746 ac.	03% / 5,628 ac.	62% / 103,805 ac.	100% / 167,179 ac.
Migration and Connectivity	27% / 18,985 ac.	4% / 2,487 ac.	69% / 48,467 ac.	100% / 69,939 ac.

Geographic Areas

Under Alternative 4, Wildlife Emphasis Levels would be the same as described in Alternatives 2 -7. In addition, Alternative 4 would establish specific direction for geographic areas. This alternative would manage approximately 39 percent of the planning area with a primary emphasis, eight percent with a secondary emphasis, and 53 percent with a minor emphasis (see Table 2-1). Individual species' habitat emphasis in each geographic area is shown in Tables 2-37 – 2-43:

Table 2-37. Wildlife Empahsis Areas - Alternative 4 - Mule Deer.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29570	2	19	29591
	99.93%	0.01%	0.00%	
Cline Buttes	0	593	14674	15267
	0.00%	3.88%	96.12%	
Horse Ridge	24765	3	0	24768
	99.99%	0.01%	0.00%	
Mayfield	1544	44	0	1588
	97.23%	2.77%	0.00%	
Millican Plateau	11375	0	41307	52682
	21.59%	0.00%	78.41%	
North Millican	386	21119	32262	53767
	0.72%	39.28%	60.00%	
Prineville	2104	4037	2673	8814
	23.87%	45.80%	30.33%	
Prineville Reservoir	29802	52	9622	39476
	75.49%	0.13%	24.37%	
Smith Rock	2110	0	0	2110
	100.00%	0.00%	0.00%	
South Millican	17547	7	0	17554
	99.96%	0.04%	0.00%	
Northwest	6626	119	0	6745
	98.24%	1.76%	0.00%	
Steamboat Rock	5301	0	50	5351
	99.07%	0.00%	0.93%	
Tumalo	5792	0	0	5792
	100.00%	0.00%	0.00%	
TOTAL	**136922**	**25976**	**100607**	**263505**
	51.96%	**9.86%**	**38.18%**	

Table 2-38. Wildlife Empahsis Areas - Alternative 4 - Rocky Mountain Elk.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29594	2	18	29614
	99.93%	0.01%	0.06%	
Cline Buttes	430	1,966	26,719	29,115
	1.48%	6.75%	91.77%	
Horse Ridge	5484	0	0	5484
	100.00%	0.00%	0.00%	
Lapine	3206	0	27500	30706
	10.44%	0.00%	89.56%	
Mayfield	428	11	0	439
	97.49%	2.51%	0.00%	
Millican Plateau	0	0	15105	15105
	0.00%	0.00%	100.00%	
North Millican	40	11222	23412	34674
	0.12%	32.36%	67.52%	
Prineville	34	408	497	939
	3.62%	43.45%	52.93%	
Prineville Reservoir	9411	52	2191	11654
	80.75%	0.45%	18.80%	
South Millican	4834	0	0	4834
	100.00%	0.00%	0.00%	
Northwest	6620	119	0	6739
	98.23%	1.77%	0.00%	
Steamboat Rock	4422	0	549	4971
	88.96%	0.00%	11.04%	
Tumalo	5808	0	0	5808
	100.00%	0.00%	0.00%	
TOTAL	**70,311**	**13,780**	**95,991**	**180082**
	17%	**3.2%**	**24%**	

Table 2-39. Wildlife Empahsis Areas - Alternative 4 - Golden Eagle.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Bend/Redmond	0	0	128	128
	0.00%	0.00%	100.00%	
Cline Buttes	782	1,058	3,564	5,404
	14.47%	19.58%	65.95%	
Horse Ridge	2157	1	0	2158
	99.95%	0.05%	0.00%	
Millican Plateau	3811	538	5156	9505
	40.09%	5.66%	54.25%	
North Millican	6	2009	2845	4860
	0.12%	41.34%	58.54%	
Prineville	1363	254	312	1929
	70.66%	13.17%	16.17%	
Prineville Reservoir	6945	0	117	7062
	98.34%	0.00%	1.66%	
Smith Rock	997	0	0	997
	100.00%	0.00%	0.00%	
South Millican	511	2	0	513
	99.61%	0.39%	0.00%	
Northwest	1038	0	0	1038
	100.00%	0.00%	0.00%	
Steamboat Rock	3981	0	323	4304
	92.50%	0.00%	7.50%	
Tumalo	2068	0	0	2068
	100.00%	0.00%	0.00%	
TOTAL	**23,659**	**3,862**	**12,445**	**39966**
	59.20%	**9.66%**	**31.14%**	

Table 2-40. Wildlife Empahsis Areas - Alternative 4 - Pronghorn.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	9379	0	0	9379
	100.00%	0.00%	0.00%	
Bend/Redmond	0	0	25948	25948
	0.00%	0.00%	100.00%	
Horse Ridge	19384	0	0	19384
	100.00%	0.00%	0.00%	
Mayfield	5468	137	19085	24690
	22.15%	0.55%	77.30%	
Millican Plateau	5699	1203	34333	41235
	13.82%	2.92%	83.26%	
North Millican	40	1718	22761	24519
	0.16%	7.01%	92.83%	
Prineville	435	2570	126	3131
	13.89%	82.08%	4.02%	
Prineville Reservoir	0	0	1552	1552
	0.00%	0.00%	100.00%	
South Millican	17341	0	0	17341
	100.00%	0.00%	0.00%	
TOTAL	**57746**	**5628**	**103805**	**167179**
	34.54%	**3.37%**	**62.09%**	

Table 2-41. Wildlife Empahsis Areas - Alternative 4 - Sage grouse.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Horse Ridge	14355	1	0	14356
	99.99%	0.01%	0.00%	
Millican Plateau	0	0	1943	1943
	0.00%	0.00%	100.00%	
North Millican	384	15089	28938	44411
	0.86%	33.98%	65.16%	
Prineville Reservoir	19	0	0	19
	100.00%	0.00%	0.00%	
South Millican	16864	7	0	16871
	99.96%	0.04%	0.00%	
TOTAL	**31622**	**15097**	**30881**	**77600**
	40.75%	**19.45%**	**39.80%**	

Table 2-42. Wildlife Empahsis Areas - Alternative 4 - Migration and Connectivity Corridors.

Geographical Area	Species	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
La Pine	Deer	7449 18%	0 0%	33194 82%	40643
Badlands	Pronghorn	1789 100%	0 0%	1 0%	1790
Mayfield Pond	Pronghorn	3395 69%	39 1%	1477.4 30%	4911.4
Millican Plateau	Pronghorn	0 0%	1123.4 11%	8733 89%	9856.4
North Millican	Pronghorn	0 0%	1205.3 30%	2833 70%	4038.3
Research Natural Area	Pronghorn	510.2 100%	0 0%	0 0%	510.2
Subtotals for Pronghorn		**5694.2 27%**	**2367.7 11%**	**13044.4 62%**	**21106.3**
Prineville	Elk	0 0%	67.5 100%	0 0%	67.5
Prineville Reservoir	Elk	5841.5 72%	51.8 1%	2228.6 27%	8121.9
Subtotals for Elk		**5841.5 71%**	**119.3 1%**	**2228.6 27%**	**8189.4**
TOTAL		**18984.7 27%**	**2487 4%**	**48467 69%**	**69938.7**

Table 2-43. Wildlife Empahsis Areas - Alternative 4 - All Species' Habitats.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29594	2	18 (elk)	29596
	99.99%	0.01%	0.01%	
Bend/Redmond	1326	0	40820	42146
	3.15%	0.00%	96.85%	
Cline Buttes	1292	3811	26761	31864
	4.05%	11.96%	83.99%	
Horse Ridge	25163	3	0	25166
	99.99%	0.01%	0.00%	
Lapine	7705	0	33486	41191
	18.71%	0.00%	81.29%	
Mayfield	7491	139	19378	27008
	27.74%	0.51%	71.75%	
Millican Plateau	11375	1244	43666	56285
	20.21%	2.21%	77.58%	
North Millican	386	21124	32742	54252
	0.71%	38.94%	60.35%	
Prineville	4596	4377	2889	11862
	38.75%	36.90%	24.36%	
Prineville Reservoir	29802	52	9621	39475
	75.50%	0.13%	24.37%	
Smith Rock	2119	0	0	2119
	100.00%	0.00%	0.00%	
South Millican	17680	7	0	17687
	99.96%	0.04%	0.00%	
Northwest	6626	119	0	6745
	98.24%	1.76%	0.00%	
Steamboat Rock	7094	0	5004	12098
	58.64%	0.00%	41.36%	
Tumalo	5808	0	0	5808
	100.00%	0.00%	0.00%	
TOTAL	**158057**	**30878**	**214367**	**403302**
	39.19%	**7.66%**	**53.15%**	

Special Management Areas

Areas of Critical Environmental Concern (ACECs)
Special management area designations would include the Sage Grouse ACEC, a 16,257 acre area south and east of Horse Ridge, to provide for an undisturbed wintering area for sage grouse. Additionally, in the Cline Buttes area a smaller Juniper Woodland ACEC than identified in Alternative 3 would be designated, encompassing 6,000 acres. Objectives, guidelines and probable actions for this smaller area would be similar to Alternative 3 although there would be less emphasis on non-motorized recreation. Travel in the Badlands WSA (including ACEC) would be Limited to a designated network of the inventoried routes, with seasonal restrictions from December 1 – April 30. Mineral and rockhounding guidelines for Alfalfa Market Road ACEC and Juniper Woodlands ACEC would be the same as Alternative 3.

Sage Grouse ACEC
The Sage Grouse ACEC would be designated Land Tenure Zone 2, which would allow adjustments provided there is no net loss of acreage within the ACEC and the management goals could still be attained. Livestock grazing would generally be allowed if consistent with ACEC goals and in accordance with Standards for Rangeland Health and Guidelines for Grazing Management and the RMP. Vegetation and wildlife habitat management projects would be designed to maintain or enhance the ACEC values. Long-term vegetation maintenance would be designed to emulate natural processes. Rockhounding would be limited to surface collection only.

Mineral material sales, development of mining claims, and geophysical exploration would be restricted to protect the values for which this ACEC was designated. Plans of operation would be submitted and approved by the BLM prior to any issuance of free use permits or sales contracts, or prior to the development of mining claims. Surface occupancy for fluid mineral leasing would not be allowed. Approved plans of operation would have stipulations to protect the values of this ACEC.

Wilderness Study Areas
Management would be similar to Alternative 3.

Caves

Pictograph Cave would be closed seasonally (October 15 – May 1) for a bat hibernacula. Bolted climbing routes would be allowed in Pictograph Cave subject to site specific analysis.

Land Uses

Alternative 4 would emphasize reducing conflicts between land uses and adjacent private land uses and natural resources to a moderate level, compared with the other alternatives. This alternative would also emphasize minimizing conflicts between land uses and recreation.

Approximately 332,774 acres would be available for mineral material sales. Seasonal restrictions on all mineral operations would apply to 64,723 acres and surface occupancy for fluid mineral leasing would not be allowed on 65,364 acres.

Livestock Grazing

In this alternative (as in Common to Alternatives 2 - 7), the BLM would use a formula to estimate potential for conflict and demand to help identify where problems are likely to occur (see Chapter 4 and Appendix A for definitions of conflict/demand, and details

of how this formula works). In addition, in Alternative 4 livestock grazing would be modified as necessary so that conflicts do not exceed moderate, and demand is at least moderate. Appendix G shows which allotments would be affected.

Minerals

Alternative 4 would emphasize managing conflicts with an emphasis on reducing mining conflicts with ecosystem and wildlife habitat management objectives in primary and secondary wildlife emphasis areas. 328,681 acres would be available for mineral material sales. Seasonal restrictions on all mineral operations would apply to 64,723 acres and surface occupancy for fluid mineral leasing would not be allowed on 65,364 acres. Mineral material sites would not be located within ¼ mile of residentially zoned areas or within ½ mile of designated recreation sites. Roads that feed from BLM-administered lands into residentially zoned areas may not be used for mining-related traffic (see Map S-25, Minerals Alternative 4). New mineral material sites may not be developed on BLM-administered lands where alternative source(s) are available within 30 miles driving distance of construction site(s) where the mineral materials would be used or commercial distribution centers where the mineral materials would be sold as raw materials or as finished products.

Military Uses

Alternative 4 would reduce disturbance by military operations to residents of adjacent private lands while providing a training area about the same size presently available.

Military use would be permitted as shown in Map 35, Oregon Military Department Use Areas Alternative 1,2,3 &4. Military training would be permitted on approximately 26,328 acres. The training area permitted in this alternative would be south of Highway 126, and cross Powell Buttes Highway. It would also be south of Roberts Field and Deschutes County Fairgrounds, and approximately Horner Road. From north to south, the permitted area would be east of Roberts Field, the Redmond powerline, North Unit Canal, and Boonesborough Subdivision. It would be north of Bend Sewage Treatment Facility and BLM road 6589-B. The permitted area would extend to the private land ownership in the rural community of Powell Buttes. The old clay pit north of Highway 126 would also be included in the training area. Training would no longer be permitted in that portion of Area A around Pronghorn Resort and in the area under consideration for access, frontage, or bypass routes east of Highway 97.

A quarter mile buffer in the training area would restrict training activities to avoid conflicts. Military training activities such as compass courses or infantry routes inside the buffer are appropriate activities, while equipment transport training are not.

Recreation

Alternative 4 provides a mix of recreation opportunities, but closes relatively few areas to all motorized use and instead relies more on limiting motorized use to roads in areas where non-motorized trails are provided. Approximately 60 percent of the planning area would be managed for multiple use on a shared system of roads and trails (including most of Cline Buttes, Bend/Redmond, and Millican Valley). Areas that allow motorized use on designated roads only (30 percent), while emphasizing non-motorized recreation on designated trails, include the Northwest (Squaw Creek), Tumalo, Maston Allotment, Alfalfa ACEC, Badlands, Skeleton Fire, Horse Ridge, South Millican, and areas south of Prineville Reservoir. Seasonal closures to motorized use occur in the Northwest (Squaw Creek), Tumalo, Badlands, and Highway areas. The West Butte Road would form the boundary between different seasons of use in Millican Valley. The largest closed area managed exclusively for non-motorized trail use is an area north of Prineville Reservoir and east of the Crooked River, which would include trail connections between the Wild

and Scenic River corridor and Prineville State Park. The North Millican area west of West Butte Road would be open a month later each season, allowing for riding opportunities in December. The area east of West Butte Road would be open year-round. However, under this alternative, the South Millican area would be closed to motorized trail use (see Map 18, Recreation Emphasis – Alternative 4).

Geographic Areas

Badlands
The WSA would be open seasonally to motorized use on a designated system of inventoried routes (Routes 4, 5, 6, 7, 8 and 9). Mechanized use (e.g., mountain bikes, horse drawn carts) would be allowed on designated routes. Designated parking and trailhead improvements would be a high priority under this alternative, in order to provide adequate parking for vehicles and trailers outside the WSA boundary during the period the area is closed to motorized use. The WSA would be managed as Limited to designated roads seasonally. Motor vehicle use would be seasonally restricted from December 1 to April 30.

Bend/Redmond
This alternative would be the same as Alternative 2.

Cline Buttes
Cline Buttes would be designated as Limited to designated roads and trails. Recreational uses are segregated more than Alternative 2, but less than Alternative 3. The Maston Allotment area east of Cline Falls Highway would be managed for motorized use on roads only while providing designated trails for non-motorized recreation. A portion of the historic Tumalo canals on the east side of Barr Road would also be managed for non-motorized use. The majority of the canyon trails in the northwest portion of Cline Buttes are also managed for non-motorized use, but some of the canyon trails would be included in a motorized trail system, to allow for variety in trail riding opportunities.

The Maston Allotment area east of Cline Falls Highway would be designated as Limited to designated roads.

Horse Ridge
Under this alternative, trail use in the area would be managed for non-motorized use. Motorized use would be restricted to a relatively sparse network of designated roads. Improvements would be made to parking areas, trailheads, and primitive camping areas to provide for better visitor services and protect resources at currently unmanaged dispersed use areas.

The entire area (Skeleton Fire area and Horse Ridge) would be limited to designated roads with the exception of those areas that would be Closed in Common to Alternatives 2 - 7 (area around Conestoga Hills, Rickard Road area, and the Horse Ridge ACEC/RNA).

La Pine
The entire La Pine block, would be designated as Limited to existing roads and trails except the area north of Rosland OHV Play Area and adjacent to La Pine State Park would be designated as Limited to designated roads only.

Mayfield
Under Alternative 4, the Mayfield area would be managed for shared use, with the larger block of public lands north of Alfalfa Market Road being managed for motorized use on both roads and trails. The area south of Alfalfa Market Road would be managed for non-motorized trail use, while keeping a select number of roads open.

The main block between Powell Butte Highway and Alfalfa Market Road would be Limited to designated roads and trails. The area south of Alfalfa Market Road would be Limited to designated roads only.

Millican Plateau

The majority of the Millican Plateau area would be managed for year-round OHV use on designated roads and trails. Small portions of the northern and western edges of this area would have additional motor vehicle restrictions for wildlife conservation or to better protect the Powell Butte ACEC. A small area would be closed to motor vehicle use year-round to reduce the incidence of illegal dumping.

The majority of the area would be Limited to designated roads and trails, available year-round. The northern tip of the area would be Limited to designated roads only with a smaller area Closed year-round to motor vehicle use. The western edge of the area (surrounding Powell Butte ACEC) would be Limited to designated roads only.

North Millican

Alternative 4 manages the area for seasonal motorized use on designated roads and trails. The area west of West Butte Road would be closed to motorized use from January 1 to April 30th, annually. The remainder of the area would be open to motorized use year-round on designated roads and trails. Additional trail miles would be provided in the eastern portion of the OHV area, in order to compensate for the loss of trail riding opportunities due to seasonal closure in the area west of West Butte Road. An additional play area would be developed in the area to compensate for the seasonal closure of the ODOT pit and the Cinder Pit in the Highway area. The majority of the area is managed for multiple use on a trail system predominantly designed and maintained for OHV use, with the exception of an area adjacent to the Badlands WSA (i.e., northwest of Road 6521) and the Dry Canyon area adjacent to State Highway 20. Trails in these areas would be provided solely for non-motorized use.

OHV use would be Limited to designated roads and trails May 1 thru December 31.

Northwest

The area would be managed for multiple use; however, there would be less emphasis placed on motorized recreation than on Alternative 2. Motorized trail use would be only considered if necessary to complete larger trail systems on adjacent Crooked River National Grasslands (CRNG) that require access or connections on BLM to create a functional system. A seasonal restriction on motorized use would be in place, consistent with adjacent policy on the CRNG; however, the area would remain open year-round for non-motorized use. Non-motorized trails and additional trailheads to access them would be provided. The Sisters Bouldering Area would be managed specifically for climbing use, and would be identifiable as BLM managed land.

Motorized travel would be Limited to designated roads and motorized travel on BLM roads would be limited to April 1 thru November 30. Isolated parcels west of Squaw Creek would be designated Closed to motorized use.

Prineville

This alternative changes the management emphasis of the area, closing all the small, isolated tracts of BLM managed land north of Prineville to motorized use. The larger blocks of BLM land in this area would be managed as Limited to designated roads and trails year-round. The lands to the south of Prineville and north of Prineville Reservoir would be managed for use on designated roads only, or for use on designated roads and trails.

Small parcels located north and east of Prineville would be designated as Closed, while larger parcels located north of Prineville would be designated as Limited to designated

roads and trails. The 640 acre Ochoco Reservoir parcel located north of State Highway 26 would be designated as Closed, the 120 acre parcel with a Dry Canyon feature would be also closed to motorized vehicles (see Map 11), and the BLM parcel near the Juniper Canyon summit would be designated as Limited to designated roads and motorized travel would be limited to March 16 thru November 30. Parcels located near Juniper Canyon would be Limited to designated roads. Parcels located at the south end of area would be Limited to designated roads and trails.

Prineville Reservoir
The entire area north of Prineville reservoir and east of the Crooked River would be managed for motorized use on designated roads and trails. The area south of Prineville Reservoir and east of State Highway 27 would be managed primarily for non-motorized trail use, while retaining motorized access for hunting, rockhounding, and other activities through a system of designated roads open year-round. Designated trail systems would connect to trailheads on either BLM or BOR/State Park managed lands.

OHV use would be Limited to designated roads and trails north of Prineville Reservoir and east of the Crooked River. Motorized use in the area north of Road 6590-B would be limited to May 1 thru November 30. The area south of Prineville Reservoir and east of State Highway 27 would be managed as Limited to designated roads (Taylor Butte travel is Limited under Common to Alternatives 2 - 7).

Smith Rock
This alternative would be the same as Alternative 2.

South Millican Area
Under this alternative, the use emphasis for South Millican would be on a relatively sparse network of roads for motorized use. Designated, non-motorized trails would be provided; however, the emphasis would be on developing trails on the adjacent Horse Ridge area and leaving fewer trails on the flatter South Millican area.

The entire South Millican area would be Limited to designated roads only, open year-round.

Steamboat Rock
Similar to Alternative 3 except that motorized use would be Limited to designate roads and trails and no full size vehicles would be allowed. All OHV use would be excluded from river corridors.

The main block would be Limited to designated roads and trails and Limited to Class I and III OHVs (no full size vehicles) except:

- Deschutes River corridor would be closed to all motorized use.
- Remaining portions of area subdivision would be managed as described for Common to 2 - 7.

Tumalo
The recreation management emphasis for the area would be on non-motorized trail. Motorized use would be limited to designated roads. Due its smaller size, the block of BLM land south of Tumalo Reservoir would be Closed to motorized use, and would be managed for year-round recreation use on designated, non-motorized trails.

Motorized use would be Limited to designated roads in main block north of Tumalo Reservoir.

The smaller block of BLM land south of Tumalo Reservoir would be Closed to motorized use.

Transportation and Utilities

Alternative 4 would put an increased emphasis on combining BLM and transportation systems under other jurisdictions to integrate joint transportation management objectives. Alternative 4 would emphasize a transportation corridor allocation for minor county arterial connections between Bend and Redmond that would integrate and support county transportation plans and effectively combine impacts from the Quarry Street interchange. Consideration would be given to consolidating transportation and utility systems with consideration for ecological and recreational values, while providing for regional transportation systems and meeting regional objectives.

Regional Transportation

Alternatives 4-7 would connect with Deschutes Junction and include an interchange at Quarry Road. These alternatives would likely require relinquishment of approximately 19 miles of existing road right-of-way in the Bend-Redmond block at the same time the right-of-way grant was issued.

Local Transportation

Alternative 4 identifies 39 percent of the planning area in a primary wildlife emphasis designation and 39 percent in either a non-motorized emphasis or non-motorized exclusive designation. The recreation designations may or may not be included in the primary wildlife emphasis designation (see the Recreation and Wildlife Emphasis maps (Maps 15 – 21 and 24 – 29) for specific locations).

Right-of-Way Corridors

This alternative allocates a transportation/utility corridor adjacent to the Burlington Northern/Santa Fe right-of-way approximately ½ mile wide south of Redmond, extending to Deschutes Junction.

Land Ownership

Alternative 4 would improve the public land base to better provide for recreation and maintain or improve ecological conditions and wildlife habitat while not significantly reducing the amount of public lands in any portion of the planning area. Efficient and effective management would emphasize obtaining land patterns in favor of recreation, ecological condition and wildlife. Making public land available to other agencies would have a lower priority than other objectives.

Alternative 4 would designate approximately 353,334 acres (Map 32) as Z-1 to increase the spectrum of recreation opportunities and emphasize wildlife corridors. Blocks of public lands identified as Z-1 include the north Tumalo, Cline Buttes, Bend/Redmond Core, Steamboat Rock, Smith Rocks, Mayfield Pond, Badlands, Horse Ridge, Reservoir East, Reservoir West, Southeast, Highway, and the majority of public lands in La Pine north and south of the community. Other, smaller parcels of public land identified include Grizzly Mountain and Redmond Caves.

In addition, Alternative 4 would identify approximately 31,460 acres of isolated and fringe public parcels that are generally to retain, but may be disposed of through exchange for lands with higher public values. Some of these isolated and fringe parcels are located around Cline Buttes, around Steamboat Rock, the south Powell Buttes area,

around Alfalfa, east of Grizzly Mountain, the south Tumalo area, the Skelton Cave area, the Bend/Redmond Core, and north and west of Wickiup Junction in La Pine. Other parcels include Powell Buttes, Juniper Acres, Millican, and north of Prineville Reservoir.

This alternative would create an exchange base to provide connectivity to Cline Buttes from Northwest, Steamboat Rock, and Tumalo blocks. Alternative 4 would consolidate public lands west and south of Cline Buttes while eliminating the public lands to the northwest, which have been heavily developed, and provide connectivity for and consolidation of the Powell Buttes parcels. It would also consolidate and provide connectivity between Grizzly Mountain and Ochoco National Forest. This alternative would also provide connectivity through the La Pine State Park and south of the community of La Pine.

Alternative 4 would identify approximately 10,102 acres of lands for disposal (Z-3) that generally do not provide substantial resource, public, or tribal benefits, and that may not be cost effective for the BLM to manage or that would represent a greater public benefit in other ownership. Selected public lands include isolated parcels between Bend and Redmond, isolated parcels northwest of Redmond and isolated and fringe parcels around Prineville.

In Alternative 4, approximately 8,512 acres would also be designated for community expansion (CE) and acquisition. The public lands identified for community expansion near Redmond are located east of Redmond, north of Highway 126, and west the North Unit canal; and south of Redmond, east of Highway 97, and north of the Pronghorn Destination Resort. In La Pine the areas identified are south of Wickiup Junction, east of Highway 97, and northeast and west of the community of La Pine. The parcels identified for acquisition include those between Smith Rock and Bend/Redmond, Tumalo and Cline Buttes, Northwest and Cline Buttes, Bend/Redmond and Cline Buttes, and Mayfield and the Badlands.

Public Health and Safety

Alternative 4 would close areas identical to those in Alternative 3 to all firearm discharge, but would dramatically reduce the acreage closed to firearm discharge unless legally hunting (from 30% to 6%). Remaining closures would emphasize management in the Steamboat Rock and Northwest blocks (see Table 2-44a for areas closed to all firearm discharge and Table 2-44b for areas closed to firearm discharge unless legally hunting).

Table 2 – 44a: Closed to all firearm discharge

Cline Buttes	Canal ACEC
Tumalo Block	700-acre parcel south of Tumalo Reservoir Road
Bend Redmond Block	BLM land southwest of McGrath Road including Historic Roads ACEC
Mayfield Block	Airport parcel
Horse Ridge Block	North of Rickard Road, South of Hwy. 20

Table 2 – 44b: Closed to firearm discharge unless legally hunting

Steamboat Rock Block	All BLM land south of Lower Bridge Road outside of the WSR corridor except for BLM land in the middle of the contiguous block
Northwest Block	All BLM land not closed to all firearm discharge CT Alts 2 – 7

Alternative 5

Alternative 5 would provide for ecosystem health and diversity by focusing efforts on maintenance and restoration of current conditions as described under the Key Concepts, and would anticipate lower amounts of treatment acres, especially prescribed fire acres, than alternatives with an historic emphasis. Alternatives 2, 4, and 5 would have this same emphasis. Alternative 5 would increase the amount of primary and secondary wildlife habitat emphasis in the planning area from current direction to about 60 percent of the planning area.[28] There would be no additional management direction over that Common to Alternatives 2 - 7 for riparian areas or water quality or quantity, but Alternative 5 would include a change in Special Management Areas. This alternative would not include any new ACEC designations for Old Growth Juniper Woodlands ACECs, relying instead upon the overall conservation approach that is Common to Alternatives 2 - 7. The Cline Buttes area would include an expanded area for the Peck's Milkvetch ACEC, adding approximately 7,000 acres to the existing ACEC. Alternative 5 would also include the Tumalo Canals ACEC identified as Common to Alternatives 2 - 7. This configuration of ACECs would be the same for Alternatives 5 and 6.

There would be a reduction of areas available for livestock grazing under Alternative 5 over those identified in Alternative 1 of about 160,000 acres, reducing available AUMs by about 49 percent. This alternative has the greatest reduction of acres and AUMs available to livestock grazing. There would be fewer acres available for mineral sales over those identified in Alternative 1 by about 25%. New ACEC designations indicate a greater potential for increased cost or limited availability of mineral materials within those areas, but do not prohibit specific development. Estimated forest or range products are based on the expected amount of treatment acres (in addition to the Wildland-urban interface (WUI) treatments identified as Common to Alternatives 2 - 7), and are expected to be at about 120,000 cubic feet (600,000 board feet) for Alternatives 2, 4, or 5, lower than that available under Alternatives 3, 6, or 7. . . Alternative 5 would provide an increase in the area available for permanent long-term military use over Alternatives 3 and 4, although slightly less than Alternative 2 and about the same total area as the current use area.

The recreation emphasis in Alternative 5 would slightly reduce the amount of multi-use shared facilities compared to Alternative 4 to just over half the planning area, and would have more of an emphasis on managing separate uses in the same areas than any other alternative. Areas managed exclusively for or with a non-motorized emphasis for trails would be increased over Alternative 1 from 3 percent to about 33 percent, with a greater emphasis on non-motorized emphasis areas (which provide motorized use on roads, non-motorized on trails) than exclusive non-motorized. About 88 percent of the geographic areas would emphasize recreation on designated motorized roads or roads and trails, with about 61 percent of the area available for motorized use on designated roads and trails during the most popular winter use season.

Alternative 5 has less land designated for retention (Z-1), than Alternatives 1-4. Alternative 5 has the third largest amount of lands available for retention with the possibility of exchange (Z-2) of all of the alternatives. The total amount of land classified for disposal (Z-3) is roughly the same as Alternative 1, at about 1% of the planning area. Lands classified as Community Expansion (CE) lands are similar to Alternative 1 at about 1% of the planning area, and include limitations on future uses of community expansion lands to assure those lands would continue to provide interconnected open spaces.

Designated transportation systems are altered over those in Alternative 1 and 2 by the addition of a transportation corridor south of Redmond to Deschutes Junction that

[28] For this comparison, areas designated as critical habitat in the Brothers - La Pine Resource Management Plan or as a result of other cooperative designations like winter closure areas were assumed to reflect a "primary" designation as used by the Upper Deschutes RMP.

would include a connection to Highway 97 near Quarry Road. This road configuration would be the same for Alternatives 4-7. As in Alternative 3, this alternative would designate existing roads to serve as future collectors in the BLM system. By changing the designation of some existing collector roads to local roads, additional roads fall into a category that would make them available either for future designation or closure, depending upon resource conditions and demands. Alternative 6 would anticipate future local road densities lower or seasonally restricted in areas of high wildlife emphasis, or areas designated for non-motorized emphasis. In accordance with elements common to Alternatives 2 - 7, designation of a new transportation corridor would anticipate future relinquishment of a similar amount of historic roads in the Bend-Redmond geographic area.

Alternative 5 would close the same areas to all firearm discharge as Alternative 3 and 4, but would increase the acreage closed to firearm discharge unless legally hunting to approximately 27% of the planning area. Closure areas of emphasis would include Steamboat Rock, Cline Buttes, and the La Pine area.

Ecosystem Health and Diversity

Vegetation

Special Status Plants
This alternative would be the same as Common to Alternatives 2 – 7, except one ACEC would be designated to expand the current Peck's Milkvetch ACEC.

Shrub-Steppe Communities
This alternative would be the same as Alternative 2

Old-Growth Juniper Woodlands
This alternative would be the same as Alternative 2.

Lodgepole Pine and Ponderosa Pine Forest
This alternative would be the same as Alternative 2

Wildlife

Planning Area
In Alternative 5, management actions would be designed to restore terrestrial source habitats to provide for multiple species needs and maintain important conditions for deer and elk, restore vegetation cover types in their current distribution, and restore structural stages that have declined substantially from the historical to the current period. Vegetation patches would be re-patterned to be more consistent with disturbance regimes and with the landform, climate, and biological and physical characteristics of the ecosystem (see Table 2-45, Wildlife Emphasis Summary, Alternative 5).

Geographic Areas

Alternative 5 would establish specific direction for the following geographic areas (see page 37 for a description of primary, secondary and minor wildlife emphases). Wildlife habitat emphases by geographic areas specific to species of local importance are on Tables 2-47 – 2-53, below. This alternative would manage approximately 29 percent of the planning area with a "primary" emphasis, 33 percent with a secondary emphasis, and 38 percent with a minor emphasis for wildlife (see Table 2-1).

Table 2-45:

Wildlife Emphasis Areas - Alternative 5

	Primary Percent / # acres	**Secondary** Percent / # acres	**Minor** Percent / # acres	**Totals** Percent / # acres
All Wildlife Emphasis Areas	29% / 116,802 ac.	33% / 133,969 ac.	38% / 152,559 ac.	100% / 403,330 ac.
Golden Eagles	50% / 19,798 ac.	25% / 10,112 ac.	25% / 10,058 ac.	100% / 39,968 ac.
Sage Grouse	20% / 15,895 ac.	77% / 59,762 ac.	03% / 1,943 ac.	100% / 77,600 ac.
Elk	34% / 61,447 ac.	28% / 51,066 ac.	38% / 67,661 ac.	100% / 180,174 ac.
Deer	37% / 97,563 ac.	39% / 101,478 ac.	24% / 64,471 ac.	100% / 263,512 ac.
Pronghorn	20% / 34,206 ac.	39% / 65304 ac.	41% / 67,680 ac.	100% / 167,191 ac.
Migration and Connectivity	14% / 9,772 ac.	22% / 15,691 ac.	64% / 44,479 ac.	100% / 69,942 ac.

Table 2-46. Wildlife Emphasis Areas - Alternative 5 - Mule Deer.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29588	2	2	29592
	99.99%	0.01%	0.00%	
Cline Buttes	201	1544	13522	15267
	1.32%	10.11%	88.57%	
Horse Ridge	24769	0	0	24769
	100.00%	0.00%	0.00%	
Mayfield	0	1591	0	1591
	0.00%	100.00%	0.00%	
Millican Plateau	8481	3	44199	52683
	16.10%	0.01%	83.90%	
North Millican	4286	49479	1	53766
	7.97%	92.03%	0.00%	
Prineville	3815	2093	2907	8815
	43.28%	23.74%	32.98%	
Prineville Reservoir	5252	30385	3840	39477
	13.30%	76.97%	9.73%	
Smith Rock	2110	0	0	2110
	100.00%	0.00%	0.00%	
South Millican	1292	16262	0	17554
	7.36%	92.64%	0.00%	
Northwest	6626	119	0	6745
	98.24%	1.76%	0.00%	
Steamboat Rock	5351	0	0	5351
	100.00%	0.00%	0.00%	
Tumalo	5792	0	0	5792
	100.00%	0.00%	0.00%	
TOTAL	**97563**	**101478**	**64471**	**263512**
	37.02%	**38.51%**	**24.47%**	

Table 2-47. Wildlife Emphasis Areas - Alternative 5 - Rocky Mountain Elk.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29612 99.99%	2 0.01%	2 0.01%	29616
Cline Buttes	1,570 5.38%	4,108 14.09%	23,479 80.53%	29,157
Horse Ridge	5484 100.00%	0 0.00%	0 0.00%	5484
Lapine	3206 10.44%	0 0.00%	27502 89.56%	30708
Mayfield	0 0.00%	441 100.00%	0 0.00%	441
Millican Plateau	0 0.00%	0 0.00%	15105 100.00%	15105
North Millican	3408 9.83%	31264 90.17%	1 0.00%	34673
Prineville	761 80.96%	0 0.00%	179 19.04%	940
Prineville Reservoir	1 0.01%	10298 88.08%	1393 11.91%	11692
South Millican	0 0.00%	4834 100.00%	0 0.00%	4834
Northwest	6626 98.24%	119 1.76%	0 0.00%	6745
Steamboat Rock	4971 100.00%	0 0.00%	0 0.00%	4971
Tumalo	5808 100.00%	0 0.00%	0 0.00%	5808
TOTAL	**61,447** **34.10%**	**51,066** **28.34%**	**67,661** **37.55%**	**180174**

Table 2-48. Wildlife Emphasis Areas - Alternative 5 - Golden Eagle.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Bend/Redmond	0 0.00%	0 0.00%	128 100.00%	128
Cline Buttes	1,796 33.23%	44 0.81%	3,564 65.95%	5,404
Horse Ridge	2158 99.95%	1 0.05%	0 0.00%	2159
Millican Plateau	3178 33.44%	0 0.00%	6327 66.56%	9505
North Millican	784 16.13%	4075 83.85%	1 0.02%	4860
Prineville	1402 72.72%	526 27.28%	0 0.00%	1928
Prineville Reservoir	2108 29.85%	4955 70.15%	0 0.00%	7063
Smith Rock	997 100.00%	0 0.00%	0 0.00%	997
South Millican	2 0.39%	511 99.61%	0 0.00%	513
Northwest	1038 100.00%	0 0.00%	0 0.00%	1038
Steamboat Rock	4267 99.12%	0 0.00%	38 0.88%	4305
Tumalo	2068 100.00%	0 0.00%	0 0.00%	2068
TOTAL	**19,798** **49.53%**	**10,112** **25.30%**	**10,058** **25.17%**	**39968**

Table 2-49. Wildlife Emphasis Areas - Alternative 5 - Pronghorn.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	9380 100.00%	0 0.00%	0 0.00%	9380
Bend/Redmond	0 0.00%	8 0.03%	25941 99.97%	25949
Horse Ridge	19385 100.00%	0 0.00%	0 0.00%	19385
Mayfield	0 0.00%	24687 99.96%	10 0.04%	24697
Millican Plateau	2786 6.76%	12 0.03%	38438 93.21%	41236
North Millican	246 1.00%	24274 99.00%	0 0.00%	24520
Prineville	1151 36.76%	241 7.70%	1739 55.54%	3131
Prineville Reservoir	0 0.00%	0 0.00%	1552 100.00%	1552
South Millican	1259 7.26%	16082 92.74%	0 0.00%	17341
TOTAL	**34207** **20.46%**	**65304** **39.06%**	**67680** **40.48%**	**167191**

Table 2-50. Wildlife Emphasis Areas - Alternative 5 - Sage grouse.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Horse Ridge	14356	0	0	14356
	100.00%	0.00%	0.00%	
Millican Plateau	0	0	1943	1943
	0.00%	0.00%	100.00%	
North Millican	1243	43169	0	44412
	2.80%	97.20%	0.00%	
Prineville Reservoir	19	0	0	19
	100.00%	0.00%	0.00%	
South Millican	277	16593	0	16870
	1.64%	98.36%	0.00%	
TOTAL	**15895**	**59762**	**1943**	**77600**
	20.48%	**77.01%**	**2.50%**	

Table 2-51. Wildlife Emphasis Areas - Alternative 5 - Migration and Connectivity Corridors.

Geographical Area	Species	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
La Pine	Deer	7449	0	33194	40643
		18%	0%	82%	
Badlands	Pronghorn	1789	0	1	1790
		100%	0%	0%	
Mayfield Pond	Pronghorn	0	4911.3	0	4911.3
		0%	100%	0%	
Millican Plateau	Pronghorn	22	12.5	9822.3	9856.8
		0%	0%	100%	
North Millican	Pronghorn	0	4038.7	1.2	4039.9
		0%	100%	0%	
Research Natural Area	Pronghorn	510.2	0	0	510.2
		100%	0%	0%	
Subtotals for Pronghorn		**2321.2**	**8962.5**	**9824.5**	**21108.2**
		11%	**42%**	**47%**	
Prineville	Elk	0	0	67.5	67.5
		0%	0%	100%	
Prineville Reservoir	Elk	1.3	6728.2	1393.4	8122.9
		0%	83%	17%	
Subtotals for Elk		**1.3**	**6728.2**	**1460.9**	**8190.4**
		0%	**82%**	**18%**	
TOTAL		**9771.5**	**15690.7**	**44479.4**	**69941.6**
		14%	**22%**	**64%**	

Table 2-52. Wildlife Emphasis Areas - Alternative 5 - All Species' Habitats.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29612 99.99%	2 0.01%	2 0.00%	29616
Bend/Redmond	1366 3.24%	7 0.02%	40772 96.74%	42145
Cline Buttes	4278 13.43%	4108 12.89%	23478 73.68%	31864
Horse Ridge	25166 100.00%	0 0.00%	0 0.00%	25166
Lapine	7705 18.71%	0 0.00%	33486 81.29%	41191
Mayfield	760 2.81%	26245 97.15%	11 0.04%	27016
Millican Plateau	8481 15.07%	15 0.03%	47790 84.91%	56286
North Millican	4286 7.90%	49964 92.10%	1 0.00%	54251
Prineville	2093 17.64%	6862 57.85%	2907 24.51%	11862
Prineville Reservoir	5252 13.30%	30385 76.97%	3840 9.73%	39477
Smith Rock	2119 100.00%	0 0.00%	0 0.00%	2119
South Millican	1425 8.06%	16262 91.94%	0 0.00%	17687
Northwest	6626 98.24%	119 1.76%	0 0.00%	6745
Steamboat Rock	11825 97.75%	0 0.00%	272 2.25%	12097
Tumalo	5808 100.00%	0 0.00%	0 0.00%	5808
TOTAL	**116802** **28.96%**	**133969** **33.22%**	**152559** **37.82%**	**403330**

Special Management Areas

Areas of Critical Environmental Concern (ACECs)
Objectives/standards, guidelines and probable actions would be similar to Alternative 4, except there would be no ACECs designated specifically for old-growth juniper (Alfalfa and Juniper Woodland ACECs) and sage grouse would not be designated. Instead, the Peck's Milkvetch ACEC would be expanded (to 11,144 acres from 4,073 acres) to further protect this special status plant and old-growth juniper values. As directed under Common to Alternatives 2 – 7, a 1,050-acre area would be designated as the Tumalo Canals ACEC to protect important historic resources. Travel in the Badlands WSA would be limited to a designated network of the inventoried routes, with seasonal restrictions on motorized used from July 15 to December 15, except for legal game retrieval purposes on designated inventory routes.

Total acres designated ACEC (existing and new) under Alternative 5 are 30,872.

Peck's Milkvetch ACEC
The land tenure of the Peck's Milkvetch ACEC would be expanded and designated Zone Z-2, which would allow adjustments, provided there is no net loss of acreage within the ACEC and the management goals could still be attained. Acquired lands within the ACEC would be added to the ACEC designation. Vegetation and wildlife habitat management projects would be an integral part of ACEC management and would be designed to maintain or enhance the ACEC values. Restoration/improvement of native plant communities, old-growth juniper woodlands, and habitat for raptors, neotropical birds and threatened, endangered or other special status plants and animals would be emphasized. Long-term vegetation maintenance would be designed to emulate natural processes.

Livestock grazing would be allowed if consistent with ACEC goals and in accordance with Standards for Rangeland Health and Guidelines for Grazing Management. Although Peck's Milkvetch ACEC is expanded in this alternative, the mineral and rockhounding guidelines would be the same as in Common to All Alternatives. The ACEC would be closed to firearm discharge unless hunting.

After the permanent BLM road network is established and implemented, new roads would only be considered if they replace a similar mileage of existing road. New rights-of-way would be located to emphasize co-location within existing utility corridors or along county roads or BLM arterial roads. Decommissioned roads would be obliterated and rehabilitated unless a compatible use was identified such as converting a road to a trail or preserving a historic route.

Caves

Pictograph Cave would be closed seasonally (October 15 – May 1) for bat hibernacula and would be closed to the installation of bolted climbing routes. All existing bolts and climbing hardware would be removed and the cave would be managed under Leave No Trace principles.

Land Uses

Alternative 5 emphasizes reducing conflicts between public land uses and adjacent private land uses, recreation, and natural resources to a low level in areas adjacent to land zoned residential; and allowing up to high conflicts in all other areas.

Management actions would emphasize reduction of mining conflicts with recreation and wildlife habitat in urban areas, and minimize mining conflicts with residents across the planning area.

Livestock Grazing

In this alternative (as in Common to Alternatives 2 – 7), the BLM would use a formula to estimate potential for conflict and demand to help identify where problems are likely to occur (see Chapter 4 and Appendix A for definitions of conflict/demand, and details of how this formula works). In addition, in Alternative 5 livestock grazing would be modified as necessary so that conflicts with adjacent private land uses do not exceed low, and demand in the "urban" portion of the plan is high (urban is defined in Appendix A livestock grazing section). Appendix G shows which allotments would be affected.

Minerals

Approximately 297,493 acres are available for mineral material sales. Seasonal restrictions on all mineral operations would apply to 108,007 acres and surface occupancy for fluid mineral leasing would not be allowed on 49,295 acres. Mineral material sales may not occur within ½ mile of residentially zoned areas. Roads that feed from BLM administered land into residentially zoned areas may not be used for mining-related traffic. Mineral material sales may not occur within 1/8 mile of designated recreation sites in "rural" areas, nor within ½ mile of designated recreation sites in "urban" areas (see Map S-26, Minerals Alternative 5).

Military Uses

This alternative would reduce disturbance by military operations to residents of adjacent private lands while providing a training area about the same size as presently available. The permitted area for military use would be approximately the same as in Alternative 2 except it closes Area A south of Roberts Field and Deschutes County Fairgrounds (see Map 36). Military training would be permitted on approximately 29,633 acres.
The training area permitted in this alternative would be south of O'Neil Highway, crossing both Highway 126 and Powell Buttes Highway. It would also be south of Horner Road. From north to south, the permitted area would be east of the North Unit Canal, Roberts Field, again North Unit Canal, and Boonesborough Subdivision. It would be north of Bend Sewage Treatment Facility and BLM road 6589-B. The permitted area would be west of the private land ownership in the rural community of Powell Buttes. Military training would no longer be permitted in that portion of Area A around Pronghorn Resort and in the area under consideration for access, frontage, or bypass routes east of Highway 97.

A buffer would restrict the use of heavy equipment and vehicles within a half mile of private lands. Military training activities such as compass courses or infantry routes inside the buffer are appropriate activities, while equipment transport training is not.

Recreation

Alternative 5 provides a relatively high mixture of different recreation opportunities and varying management strategies/intensities. About 50 percent of the planning area would still be managed for multiple use primarily on shared roads and trails (Millican Valley and ¾ of Cline Buttes). About 20 percent of the planning area would be managed for motorized use on roads only, while providing non-motorized trail opportunities. These areas would include the Northwest (Squaw Creek), Tumalo, Mayfield, Skeleton Fire areas, and the area south of Prineville Reservoir. A moderate amount of the planning area (approximately 12 percent) would be closed to motorized use and managed exclusively for non-motorized trail use. These areas include Horse Ridge, the Maston Allotment in Cline Buttes, the Steamboat Rock parcel, and a large area on both sides of the Chimney Rock segment of the lower Crooked River. The Bend Redmond block

would be intensively managed for multiple use on separate trail systems. The North Millican area would be open for OHV use a month later to allow for riding opportunities in December (see Map 19, Recreation Emphasis – Alternative 5).

Geographic Areas

Badlands
Under Alternative 5, the Badlands WSA would be managed with almost the same layout (i.e., Routes 5, 6, 7, and 8) of designated, inventoried routes for motorized use as the present policy (Alternative 1, which reflects the settlement agreement from the Millican Lawsuit.), with the exception of Route 4 from the Route 8 junction to Route 5 Junction. Route 4 would be managed as a non-motorized route year-round. The WSA is closed to motorized use from July 15 to December 15, except for legal game retrieval on the designated, inventoried routes. The WSA would remain open to mechanized use year-round. This alternative also places relatively high emphasis on designation and improvement of parking areas to support use during periods when vehicles are restricted.

Bend/Redmond
This alternative would be similar to Alternatives 2 and 4, with an additional emphasis on OHV trail system and a non-motorized system in the same area. Development of separate trails for different uses would likely require a lower trail density for each type of use. This alternative places the greatest emphasis on trail signing, trail maps, separate motorized and non-motorized access points.

Allocations and allowable uses would remain the same as Alternatives 2 and 4.

Cline Buttes
The area would be divided into different use areas to reduce user conflicts. The Maston Allotment east of Cline Falls Highway would be designated Closed to motor vehicles. Most of the area between Barr Road and Cline Falls Highway would be managed for motorized use on designated roads. Recreation use in both these areas would be managed for an emphasis on non-motorized use occurring on designated roads and trails. The entire historic canal system (Tumalo Canal ACEC) east of Barr Road would be managed for foot use. The canals west of Barr Road are managed to emphasize a greater variety of non-motorized use, including equestrians and mountain bikes. The dry canyon complex would be managed almost exclusively for non-motorized use; however, at least one motorized trail would be located in the canyons.

The area west of Cline Falls Highway, east of Eagle Crest Phase III access road, and east of Barr Road would be Limited to designated roads only. The Maston allotment east of Cline Falls Highway would be Closed to motor vehicles. The remainder of Cline Buttes would be Limited to designated roads and trails year-round, with an emphasis on multi-use trail designation in the center and northern portions of the block.

Horse Ridge
Under this alternative, the Skeleton Fire area would be managed for motorized use on a few main roads, much like it is today. Designated trails would be developed for non-motorized use in the same area. Horse Ridge and the area between State Highway 20 and the old Highway would be managed for non-motorized trail use.

In addition to those areas that would be Closed Common to Alternatives 2 – 7 (area around Conestoga Hills, Rickard Road area, and the Horse Ridge ACEC/RNA) the following travel designations would apply to the Horse Ridge area:

- The Skeleton Fire area would be Limited to designated roads.

- Horse Ridge area would be designated as Closed to motorized vehicles. This closure extends northwest into the area between State Highway 20 and the old Highway 20 alignment (T18S, R14E, Sec. 30, 31,32; T19S, R14E, Sec. 5, 4, 3, 10; T18S, R13E, Sec. 25).

La Pine
Alternative 5 retains a high degree of public access and motorized use throughout BLM managed lands in the La Pine area; however, this alternative does change the existing management from an Open designation to a designated system of roads and trails throughout the area.

The entire La Pine block, (except the river parcels) would be Limited to existing roads and trails, except the area north of Rosland OHV Play Area and adjacent to La Pine State Park, which would be designated as Limited to Designated Roads only.

Mayfield
Alternative 5 differs substantially from all other alternatives by managing the main Mayfield block for non-motorized trail use only. Under this alternative, motorized use would be allowed only on designated roads. The Airport allotment would continue to remain closed to motor vehicles. A separate designated trail system would be implemented that may use some of the existing roads in the area.

Main block and area south of Alfalfa Market Road would be designated Limited to designated roads only.

Millican Plateau
The northern portion of the area would be managed for year-round use on designated roads and trails. In addition, the smaller, isolated parcels and BLM lands to the east of the Juniper Acres subdivision are either designated as Closed to motor vehicles or managed for use on designated roads only.

Motorized travel in the area north of Kitchen Hill would be Limited to designated roads and trails, except for:
- Isolated parcels located within and east of Juniper Acres subdivision are either Closed to motorized use or Limited to designated roads only (see Map 12).
- An area along the Crooked River Canyon (i.e., east of Road 6555-b) would be Closed to motorized vehicles.
- An area along the Crooked River and east of Millican Road would be Closed to motorized vehicle use year-round.

North Millican
Alternative 5 manages the majority of the area for motorized use on a seasonal basis, by limiting OHV use to May 1 thru November 30. This alternative places more emphasis on separating uses by designating the northwest portion of the area (dry canyon area) as Closed to motorized use year-round, and creating a designated, non-motorized trail system in this area. Mechanized use would be allowed year-round throughout the entire area.

The majority of the area south of Kitchen Hill would be managed as Limited to designated roads and trails. This area would be Closed to motorized use from January 1 to April 30, except the ODOT pit play area which would be open year-round, and the Dry Canyon and the area north of Trail 41, which would be Limited to designated roads only. Entire area would be open to non-motorized use on designated trails year-round.

Northwest
The area would be managed with an emphasis on development of non-motorized, designated trails that provide connectivity to a regional trail system, links to Sisters Community trails, and links to non-motorized trail systems on CRNG to the north.

Motorized use would be Limited to designated roads only. A seasonal restriction on motorized use would be in place, consistent with adjacent policy on the CRNG; however, the area remains open year-round for non-motorized use. Non-motorized trails and additional trailheads to serve them are provided. The Sisters Bouldering Area would be managed specifically for climbing use, and would be identifiable as BLM managed land. Motorized travel in main block Limited to designated roads. Motorized use would be limited to April 1 thru November 30. Isolated parcels west of Squaw Creek Closed to motorized travel, except for Sisters Bouldering Area (see Common to All Alternatives).

Prineville
This alternative changes the management emphasis of the area, changing the management of the small, isolated tracts of BLM managed land north of Prineville to motorized use on designated roads only. The larger blocks of BLM land in this area would be managed as Limited to designated roads and trails year-round. The lands to the south of Prineville and north of Prineville Reservoir would be managed for use on designated roads only, or for use on designated roads and trails.

Small parcels located north and east of Prineville would be Closed, while larger parcels located north of Prineville would be Limited to designated roads. The 640-acre Ochoco Reservoir parcel located north of State Highway 26 would be designated Closed.

Prineville Reservoir
The area north of Prineville reservoir and immediately east of the Crooked River would be managed for exclusive non-motorized use. The area north of the upper end of Prineville Reservoir would be managed for motorized use on designated roads only. The area south of Prineville Reservoir and east of State Highway 27 would be managed primarily for non-motorized trail use, while retaining motorized access for hunting, rockhounding, and other activities through a system of designated roads open year-round. Designated trail systems would connect to trailheads on either BLM or BOR/ State Park managed lands.

OHV use would be Limited to designated roads and trails north of Prineville Reservoir and east of the Crooked River. Motorized use in the area north of Road 6590-B would be limited May 1 thru November 30. The area south of Prineville Reservoir and east of State Highway 27 would be managed as Limited to designated roads (Taylor Butte travel is Limited under Common to Alternatives 2 - 7).

Smith Rock
This alternative would be the same as Alternative 2.

South Millican
South Millican would remain as an OHV use area, and would be open for this use from September 15 to March 15. No new trail connections would be provided between the motorized trail system in South Millican and trails in the adjacent Deschutes National Forest.

OHV travel in South Millican would be Limited to designated roads and trails between February 15 and July 31.

Steamboat Rock
Steamboat Rock block would be Closed to motorized use year-round. The Crooked River Ranch emergency exit at 81st Street would be kept open, but otherwise all roads would be closed and only administrative use or access under permit would be allowed. The area would be managed to emphasize designated, non-motorized trail use and regional trail connectivity.

Main Steamboat Rock block would be Closed to motor vehicles.

Tumalo
This alternative would be the same as Alternative 4

Transportation and Utilities

Regional Transportation

In Alternative 5, management actions would be designed to consolidate transportation and utility systems with consideration for ecological and recreational values, while providing for regional transportation systems and meeting regional objectives. Alternative 5 would be the same as Alternatives 4, 6, and 7 with respect to the regional transportation system.

Local Transportation

Alternative 5 identifies 29 percent of the planning area in a primary wildlife emphasis designation and 34 percent in either a non-motorized emphasis or non-motorized exclusive designation. The recreation designations may or may not be included in the primary wildlife emphasis designation. Refer to the Recreation and Wildlife Emphasis maps for specific locations.

Land Ownership

This alternative prioritizes land actions, in the rural areas, that focus on recreation and indirectly on wildlife. In the urban area, community needs would be emphasized, where the majority of such requests originate, but follows recreation priority. Land actions that improve management ease or land patterns constitute a third priority. No proximity restrictions are applied to exchanges in Alternative 5, as are placed in Alternatives 4 and 6.

Management actions in Alternative 5 would retain public lands in the more urban areas to provide for moderate recreational uses, retain lands in the more rural areas to provide for intensive recreational uses and identify parcels that are generally to retain, but may be disposed of through exchange for lands with higher public values primarily for the purposes of connectivity, with a secondary emphasis on consolidation. In addition, this alternative would identify lands for disposal (Z-3) that generally do not provide substantial resource, public, or tribal benefits that may not be cost effective for the BLM to manage or that would represent a greater public benefit in other ownership, and provide land for community needs and uses. Private parcels with access to public lands would also be acquired to promote connectivity for wildlife between larger blocks of habitat in the rural areas.

Approximately 373,914 acres would be designated for retention. Blocks of public lands that have already been identified as Z-1 include Tumalo, Cline Buttes, Bend/Redmond Core, Smith Rocks, Mayfield, Badlands, Horse Ridge, Reservoir East, Reservoir West, Southeast, Highway, and all public lands in La Pine except three parcels identified as Z-2. Other, smaller parcels of public land identified include Grizzly Mountain, Ochoco Reservoir, and Juniper Canyon.

The lands on Map 33 would be designated as Z-2 (approximately 10,517 acres). These parcels include those adjacent to cities, towns, and communities that may be exchanged for lands with higher public values for community expansion and other public purposes. In addition, isolated and fringe public parcels have been identified as Z-2 to provide connectivity between larger blocks and eliminate trail and road entries onto private lands in the rural areas. Parcels include Steamboat Rock, Redmond Caves, parcels around

Alfalfa, parcels east of Juniper Acres, parcels east of Millican, and Skeleton Cave. In La Pine, three parcels are identified east of Wickiup Junction.

This alternative would designate the lands on Map 33 as Z-3 (approximately 13,249 acres). This alternative identifies isolated parcels between Bend and Redmond, isolated parcels northwest of Redmond, isolated and fringe parcels around Prineville, and a fringe parcel on the Powell Buttes block. Some but not all land previously identified as Z-3 lands in Brothers La Pine RMP would retain this designation.

Alternative 5 would designate the lands on Map 3 as Community Expansion (CE) lands (approximately 5,727 acres). The public lands identified for community expansion near Redmond are located east of Redmond and west of North Unit Canal and south of Redmond approximately ½ mile, and east of Highway 97. Public lands were identified for a park at Barnes Butte northeast of Prineville. Public lands were identified for a park between Eagle Crest Phase II and Phase III and south of Hwy 126. The parcel south of Bend Airport was identified for a park and public facilities. Two 40-acre parcels in Juniper Acres Subdivision were identified for parks. No public lands are identified for community expansion in La Pine.

Finally, Alternative 5 would designate parcels, as shown on Map 33 for acquisition. Acquisition parcels include those between Northwest and Cline Buttes, the National Grasslands and Ochoco National Forest, and Mayfield and the Badlands. A lesser emphasis would be to obtain lands to consolidate public lands in Zones 1 and 2 and to enhance public resource values, specifically in Southeast, Horse Ridge, and La Pine.

Public Health and Safety

Alternative 5 would close the same areas as Alternatives 3 and 4 to all firearm discharge, but would increase the acreage closed to firearm discharge unless legally hunting to approximately 27% of the planning area. Closure areas of emphasis would include Steamboat Rock, Cline Buttes, and the La Pine area.

The areas identified in Tables 2-53a and 2-53b below would be closed to all firearm discharge and to firearm discharge unless legally hunting, respectively.

Table 2 – 53a: Closed to all firearm discharge

Cline Buttes	Canal ACEC
Tumalo Block	700-acre parcel south of Tumalo Reservoir Road
Bend Redmond Block	BLM land southwest of McGrath Road including Historic Roads ACEC
Mayfield Block	Airport parcel
Horse Ridge Block	North of Rickard Road, South of Hwy. 20

Table 2 – 53b: Closed to firearm discharge unless legally hunting

Steamboat Rock Block	All BLM land south of Lower Bridge Road outside of the WSR corridor
Northwest Block	All BLM land not closed to all firearm discharge CT Alts 2 - 7
Cline Buttes Block	Entire Cline Buttes block except for closures to all firearm discharge CT Alts 2 - 7
Mayfield Pond Block	Main block – south of Alfalfa Market Road
Prineville Reservoir Block	BLM lands contiguous and east of Lower Crooked WSR and contiguous and west of BOR/Prineville Reservoir
Millican Plateau Block	BLM lands contiguous and west of the Lower Crooked WSR, and east of Road 6665
La Pine Block	Entire block except for parcels closed to all firearm discharge CT Alts 2-7

Alternative 6

Alternative 6 would provide for ecosystem health and diversity by focusing efforts on maintenance and restoration of historic conditions as described under the Key Concepts, and would anticipate higher amounts of treatment acres, especially prescribed fire acres, than alternatives with a current distribution emphasis. Alternatives 3, 6, and 7 would have this same emphasis. Alternative 6 would increase the amount of primary and secondary wildlife habitat emphasis in the planning area from current direction to about 61 percent of the planning area.[29] There would be no additional management direction over that Common to Alternatives 2 - 7 for riparian areas or water quality or quantity, but Alternative 6 would include a change in Special Management Areas. This alternative would not include any new ACEC designations for Old Growth Juniper Woodlands ACECs, relying instead upon the overall conservation approach that is Common to Alternatives 2 - 7. The Cline Buttes area would designate an expanded area for the Peck's Milkvetch ACEC, expanding it from the current 4,000 acres to about 11,000 acres. Alternative 6 would also include the Tumalo Canals ACEC identified as Common to Alternatives 2 - 7, and the designation of a scenic ACEC for the Smith Rock area.

There would be a reduction of areas available for livestock grazing under Alternative 6 over those identified in Alternatives 1 of about 41,000 acres, reducing available AUMs by about six percent. This alternative would be the same as Alternative 3 regarding available minerals. There would be fewer acres available for mineral sales over those identified in Alternative 1 by about 16%. New ACEC designations indicate a greater potential for increased cost or limited availability of mineral materials within those areas, but do not prohibit specific development. Estimated forest or range products are based on the expected amount of treatment acres (in addition to the Wildland-urban interface (WUI) treatments identified as Common to Alternatives 2 - 7), and are expected to be at about 150,000 cubic feet (750,000 board feet) for Alternatives 3, 6, or 7, more than that available under Alternatives 2, 4, or 5 . Alternative 6 would nearly double the area available for permanent long-term military use over Alternative 1.

The recreation emphasis in Alternative 6 would substantially reduce the amount of multi-use shared facilities compared to Alternative 1 to about 41 percent of the planning area, and would have more of an emphasis on segregating uses than on managing separate uses in the same areas. Areas managed exclusively for or with a non-motorized emphasis for trails would be increased over Alternative 1 from 3 percent to about 39 percent, with a greater emphasis on exclusive non-motorized areas than on motorized emphasis areas (which provide motorized use on roads, non-motorized on trails). About 79 percent of the geographic areas would emphasize recreation on designated motorized roads or roads and trails, with about 51 percent of the area available for motorized use on designated roads and trails during the winter use season.

Alternative 6 has more land designated for retention (Z-1), than Alternatives 1, 4, 5, or 7, but less than Alternatives 2 and 3. Alternative 6 has the third lowest amount of lands available for retention with the possibility of exchange (Z-2) of all of the alternatives. The total amount of land classified for disposal (Z-3) is slightly less than Alternative 1, at about 3% of the planning area. Lands classified as Community Expansion (CE) lands are similar to Alternative 1 at about 1% of the planning area, and include limitations on future uses of CE lands for parks, open space, and open community infrastructure needs, and limitations on exchange lands to obtain equitable habitat or recreational values.

Designated transportation systems would be altered over those in Alternative 1 and 2 by the addition of a transportation corridor south of Redmond to Deschutes Junction that would include a connection to Highway 97 near Quarry Road. This road configuration would be the same for Alternatives 4-7. As in Alternative 3, this alternative would designate existing roads to serve as future collectors in the BLM system. By changing

[29] For this comparison, areas designated as critical habitat in the Brothers - La Pine Resource Management Plan or as a result of other cooperative designations like winter closure areas were assumed to reflect a "primary" designation as used by the Upper Deschutes RMP.

the designation of some existing collector roads to local roads, additional roads fall into a category that would make them available either for future designation or closure, depending upon resource conditions and demands. Alternative 6 would anticipate future local road densities to be lower or seasonally restricted in areas of high wildlife emphasis, or areas designated for non-motorized emphasis. In accordance with elements common to Alternatives 2 - 7, designation of a new transportation corridor would anticipate future relinquishment of a similar amount of historic roads in the Bend-Redmond geographic area.

Compared with Alternatives 3-5, Alternative 6 would reduce the acreage closed to all firearm discharge, only continuing closures associated with ACECs. Alternative 6 would also close less acreage to firearm discharge unless legally hunting (14%); closures of this second type would remain in urban parcels, the Badlands area, and lands near the Crooked River WSR.

Ecosystem Health and Diversity

Vegetation

Same as Alternative 3 except there would be no designations of ACECs specifically for old-growth juniper woodlands.

Wildlife

Planning Area
Alternative 6 would emphasize restoring terrestrial source habitats to provide for species needs across their historic distribution with a focus toward biological diversity. This alternative would provide direction to increase the geographic extent of vegetation cover type-structural stages that have declined substantially from the historical to the current period within most Geographic Areas, and re-pattern the vegetation patches so they are consistent with disturbance regimes and with the landform, climate, and biological and physical characteristics of the ecosystem (see Table 2-54).

Table 2-54.

Wildlife Emphasis Areas - Alternative 6

	Primary Percent / # acres	**Secondary** Percent / # acres	**Minor** Percent / # acres	**Totals** Percent / # acres
All Wildlife Emphasis Areas	54% / 218,099 ac.	7% / 28,917 ac.	39% / 156,316 ac.	100% / 403,332 ac.
Golden Eagles	66% / 26,583 ac.	03% / 1,046 ac.	31% / 12,340 ac.	100% / 9,969 ac.
Sage grouse	77% / 59,572 ac.	02% / 1,195 ac.	22% / 16,836 ac.	100% / 77,603 ac.
Elk	70% / 127,411 ac.	02% / 3,800 ac.	27% / 48,964 ac.	100% / 180,175 ac.
Deer	65% / 171,429 ac.	05% / 13,165 ac.	30% / 78,920 ac.	100% / 263,514 ac.
Pronghorn	33% / 55,660 ac.	07% / 11,784 ac.	60% / 99,748 ac.	100% / 167,192 ac.
Migration and Connectivity	75% / 52,258 ac.	8% / 5,351 ac.	18% / 12,331 ac.	100% / 69,939 ac.

Geographic Area

Alternative 6 would establish specific direction for the following geographic areas (see page XX for a description of primary, secondary and minor wildlife emphases). This alternative would manage approximately 54 percent of the planning area with a primary emphasis, 7 percent with a secondary emphasis, and 39 percent with a minor emphasis for wildlife (see Table 2-1). Wildlife habitat emphases by geographic area and specific to species of local importance can be found in Tables 2-55 – 2-61, Wildlife Emphasis Areas, Alternative 6, below:

Table 2-55. Wildlife Emphasis Areas - Alternative 5 - Mule Deer.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29591	0	0	29591
	100.00%	0.00%	0.00%	
Cline Buttes	0	593	14674	15267
	0.00%	3.88%	96.12%	
Horse Ridge	24767	1	0	24768
	100.00%	0.00%	0.00%	
Mayfield	44	1548	0	1592
	2.76%	97.24%	0.00%	
Millican Plateau	6039	1	46642	52682
	11.46%	0.00%	88.53%	
North Millican	51717	2052	0	53769
	96.18%	3.82%	0.00%	
Prineville	3712	5103	0	8815
	42.11%	57.89%	0.00%	
Prineville Reservoir	35613	3864	0	39477
	90.21%	9.79%	0.00%	
Smith Rock	2110	0	0	2110
	100.00%	0.00%	0.00%	
South Millican	199	3	17352	17554
	1.13%	0.02%	98.85%	
Northwest	6745	0	0	6745
	100.00%	0.00%	0.00%	
Steamboat Rock	5100	0	252	5352
	95.29%	0.00%	4.71%	
Tumalo	5792	0	0	5792
	100.00%	0.00%	0.00%	
TOTAL	**171429**	**13165**	**78920**	**263514**
	65.05%	**5.00%**	**29.95%**	

Table 2-46. Wildlife Emphasis Areas - Alternative 5 - Rocky Mountain Elk.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29616	0	0	29616
	100.00%	0.00%	0.00%	
Cline Buttes	0	593	28,564	29,157
	0.00%	2.03%	97.97%	
Horse Ridge	5483	1	0	5484
	99.98%	0.02%	0.00%	
Lapine	30708	0	0	30708
	100.00%	0.00%	0.00%	
Mayfield	11	430	0	441
	2.49%	97.51%	0.00%	
Millican Plateau	224	0	14882	15106
	1.48%	0.00%	98.52%	
North Millican	33497	1177	0	34674
	96.61%	3.39%	0.00%	
Prineville	761	179	0	940
	80.96%	19.04%	0.00%	
Prineville Reservoir	10274	1417	0	11691
	87.88%	12.12%	0.00%	
South Millican	0	3	4831	4834
	0.00%	0.06%	99.94%	
Northwest	6745	0	0	6745
	100.00%	0.00%	0.00%	
Steamboat Rock	4284	0	687	4971
	86.18%	0.00%	13.82%	
Tumalo	5808	0	0	5808
	100.00%	0.00%	0.00%	
TOTAL	**127,411**	**3,800**	**48,964**	**180175**
	70.72%	**2.11%**	**27.18%**	

Table 2-57. Wildlife Emphasis Areas - Alternative 5 - Golden Eagle.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Bend/Redmond	0	128	0	128
	0.00%	100.00%	0.00%	
Cline Buttes	0	44	5,360	5,404
	0.00%	0.81%	99.19%	
Horse Ridge	2158	1	0	2159
	99.95%	0.05%	0.00%	
Millican Plateau	3114	534	5858	9506
	32.76%	5.62%	61.62%	
North Millican	4846	15	0	4861
	99.69%	0.31%	0.00%	
Prineville	1605	324	0	1929
	83.20%	16.80%	0.00%	
Prineville Reservoir	7062	0	0	7062
	100.00%	0.00%	0.00%	
Smith Rock	997	0	0	997
	100.00%	0.00%	0.00%	
South Millican	2	0	511	513
	0.39%	0.00%	99.61%	
Northwest	1038	0	0	1038
	100.00%	0.00%	0.00%	
Steamboat Rock	3693	0	611	4304
	85.80%	0.00%	14.20%	
Tumalo	2068	0	0	2068
	100.00%	0.00%	0.00%	
TOTAL	**26,583**	**1,046**	**12,340**	**39969**
	66.51%	**2.62%**	**30.87%**	

Table 2-58. Wildlife Emphasis Areas - Alternative 5 - Pronghorn.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	9380	0	0	9380
	100.00%	0.00%	0.00%	
Bend/Redmond	0	1465	24484	25949
	0.00%	5.65%	94.35%	
Horse Ridge	19383	1	0	19384
	99.99%	0.01%	0.00%	
Mayfield	98	5475	19124	24697
	0.40%	22.17%	77.43%	
Millican Plateau	1855	551	38830	41236
	4.50%	1.34%	94.17%	
North Millican	24519	2	0	24521
	99.99%	0.01%	0.00%	
Prineville	396	2735	0	3131
	12.65%	87.35%	0.00%	
Prineville Reservoir	0	1552	0	1552
	0.00%	100.00%	0.00%	
South Millican	29	3	17310	17342
	0.17%	0.02%	99.82%	
TOTAL	**55660**	**11784**	**99748**	**167192**
	33.29%	**7.05%**	**59.66%**	

Table 2-58. Wildlife Emphasis Areas - Alternative 5 - Sage grouse.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Horse Ridge	14356	0	0	14356
	100.00%	0.00%	0.00%	
Millican Plateau	1943	0	0	1943
	100.00%	0.00%	0.00%	
North Millican	43219	1195	0	44414
	97.31%	2.69%	0.00%	
Prineville Reservoir	19	0	0	19
	100.00%	0.00%	0.00%	
Smith Rock	0	0	0	0
	0	0	0	
South Millican	35	0	16836	16871
	0.21%	0.00%	99.79%	
TOTAL	**59572**	**1195**	**16836**	**77603**
	76.77%	**1.54%**	**21.70%**	

Table 2-60. Wildlife Emphasis Areas - Alternative 5 - Migration and Connectivity Corridors.

Geographical Area	Species	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
La Pine	Deer	38971.2	0	1671.9	40643.1
		96%	0%	4%	
Badlands	Pronghorn	1790	0	0	1790
		100%	0%	0%	
Mayfield Pond	Pronghorn	0	3395	1516.4	4911.4
		0%	69%	31%	
Millican Plateau	Pronghorn	243	470.8	9142.6	9856.4
		2%	5%	93%	
North Millican	Pronghorn	4039	0	0	4039
		100%	0%	0%	
Research Natural Area	Pronghorn	510.2	0	0	510.2
		100%	0%	0%	
Subtotals for Pronghorn		**6582.2**	**3865.8**	**10659**	**21107**
		31%	**18%**	**50%**	
Prineville	Elk	0	67.5	0	67.5
		0%	100%	0%	
Prineville Reservoir	Elk	6704.4	1417.3	0	8121.7
		83%	17%	0%	
Subtotals for Elk		**6704.4**	**1484.8**	**0**	**8189.2**
		82%	**18%**	**0%**	
TOTAL		**52257.8**	**5350.6**	**12330.9**	**69939.3**
		75%	**8%**	**18%**	

Table 2-61. Wildlife Emphasis Areas - Alternative 5 - All Species' Habitats.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29616	0	0	29616
	100.00%	0.00%	0.00%	
Bend/Redmond	1367	9466	31312	42145
	3.24%	22.46%	74.30%	
Cline Buttes	0	593	31271	31864
	0.00%	1.86%	98.14%	
Horse Ridge	25165	1	0	25166
	100.00%	0.00%	0.00%	
Lapine	39519	0	1672	41191
	95.94%	0.00%	4.06%	
Mayfield	858	6698	19459	27015
	3.18%	24.79%	72.03%	
Millican Plateau	6039	592	49654	56285
	10.73%	1.05%	88.22%	
North Millican	52203	2052	0	54255
	96.22%	3.78%	0.00%	
Prineville	6213	5648	0	11861
	52.38%	47.62%	0.00%	
Prineville Reservoir	35613	3864	0	39477
	90.21%	9.79%	0.00%	
Smith Rock	2119	0	0	2119
	100.00%	0.00%	0.00%	
South Millican	200	3	17484	17687
	1.13%	0.02%	98.85%	
Northwest	6745	0	0	6745
	100.00%	0.00%	0.00%	
Steamboat Rock	6634	0	5464	12098
	54.84%	0.00%	45.16%	
Tumalo	5808	0	0	5808
	100.00%	0.00%	0.00%	
TOTAL	**218099**	**28917**	**156316**	**403332**
	54.07%	**7.17%**	**38.76%**	

Hydrology

Riparian and Watershed Function
This alternative would be the same as Alternative 3.

Special Management Areas

ACECs
This alternative would be similar to Alternative 5 and would include the Smith Rock ACEC (designated in Alternative 3). Objectives, guidelines and probable actions for ACECs designated in Alternative 6 have been discussed under Alternatives 3 and 5. The Badlands ACEC would be closed to both motorized and mechanized use, except Reynolds Pond, which would be open to mechanized use. The mineral and rockhounding guidelines for Peck's Milkvetch ACEC would be the same as Alternatives 5, for Tumalo Canal ACEC would be the same as defined under Common to Alternatives 2 – 7, and for Smith Rock ACEC would be the same as Alternative 3.

Total acres designated ACEC (existing and new) under Alternative 6 would be 33,102.

Caves

Pictograph Cave would be closed seasonally (October 15 – May 1) for bat hibernacula. The cave would be closed to the installation of bolted climbing routes. All existing bolts and climbing hardware would be removed and the cave would be managed under Leave No Trace principles.

Land Uses

Alternative 6 emphasizes reducing conflicts between land uses and recreation, and land uses and natural resources, to a low level in areas not adjacent to land zoned residential; and allowing up to high conflicts in all other areas.

Livestock Grazing

In this alternative (as in Alternatives 2 - 7), the BLM would use a formula to estimate potential for conflict and demand to help identify where problems are likely to occur. In Alternative 6 livestock grazing would be modified as necessary so that demand is high in the "rural" portion of the plan (rural is defined in Common to 2-7 livestock grazing section, under "models"). Appendix G shows which allotments would be affected.

Minerals

In addition to methods to manage conflicts with residents as outlined in Alternative 2, Alternative 6 would provide direction to reduce mining conflicts with recreation and wildlife habitat in "rural" areas.

Mineral material sites would not be allowed within 1/8 mile of residentially zoned areas. Roads that feed from BLM-administered land into residentially zoned areas may be used for mining-related traffic only if alternate routes are not available. Mineral material sales may not occur within 1/8 mile of designated recreation sites in "urban" areas, nor within ½ mile of designated recreation sites in "rural" areas. Under this alternative, approximately 332,774 acres would be available for mineral material sales. Seasonal restrictions on all mineral operations would apply to 113,265 acres and surface occupancy for fluid mineral leasing would not be allowed on 49,295 acres (see Map S-27, Minerals Alternative 6).

Military Uses

This alternative allows for addition of new training lands in order to reduce concentration of military training on remaining lands. Three rotational training areas would be designated so that one training area would be available for training for a specific duration, estimated at three years per area. Alternative 6 would permit military training while reducing concentration of impacts on a single area and promoting restoration of areas heavily impacted by recreational activity and dumping. The total area of public lands for military uses would be 55,665 acres.

Military use would be allowed as shown in Map 36. The training area permitted in this alternative would be south of O'Neil Highway, crossing both Highway 126 and Powell Buttes Highway. It would also be south of Roberts Field, Deschutes County Fairgrounds, and the new Redmond Golf Course. From north to south, the permitted area would remain approximately a mile east of the public land boundary, in the same alignment as currently provided. It would be north of the Bend Sewage Treatment Facility, Bend Airport, and BLM road 6589-B. The permitted area would be west of the private land ownership in the rural community of Powell Buttes.

This alternative would allocate a fixed military training area. The fixed training area would be approximately 36,397 acres; generally the same area as in Alternative 2.

Recreation

Like Alternative 5, this alternative provides a relatively high mixture of different recreation opportunities and varying management strategies/intensities. As compared to Alternative 5, a slightly smaller portion (40 percent) of the planning area would still be managed for multiple use primarily on shared roads and trails (Millican Valley and Bend/Redmond areas). A slightly smaller portion (17 percent) of the planning area would be managed for motorized use on roads only, while providing non-motorized trail opportunities. These areas would include the Northwest (Squaw Creek), Steamboat Rock parcel, and Skeleton Fire areas; and the area south of Prineville Reservoir. Alternative 6 closes the highest percentage of the area to motorized use year-round (19.5 percent), and most of these areas would be managed for non-motorized trail use. Unlike all other alternatives, one large block of land including the Badlands WSA, a portion of the North Millican OHV area, and Horse Ridge would be closed to motorized use year-round. This alternative also proposes the most intensive and high cost management strategy for Cline Buttes, essentially limiting motorized travel to designated roads while providing designated trails for non-motorized users. The North Millican area would be closed during the winter and early spring, resulting in increased use of Millican Plateau, Bend/Redmond, and Mayfield areas for OHV use. Alternative 6 represents the largest shift in management emphasis for the La Pine area.

The foundation of Alternative 6 for Recreation is the guidance that is common to all alternatives and Common to Alternatives 2 - 7. Most of this guidance applies to the planning Area as a whole. Differences between Alternative 6 and the other alternatives are largely in how the Objectives are met across the planning area (see Map 20, Recreation Emphasis – Alternative 6).

Geographic Areas

Badlands

Under Alternative 6, the Badlands WSA would be managed for primitive, non-motorized and non-mechanized recreation. The WSA would be closed to motor vehicle and mechanized use year-round. The WSA would be closed to mechanized use, (e.g., mountain bikes, horse drawn carts, etc.) except for the area immediately surrounding Reynolds Pond (See Map 7, Special Management Areas). Motorized use closures would

encompass an additional 5,000 acres to the southeast of the WSA (see North Millican–Alternative 6). Due to the vehicle closures, a high priority would be given to providing designated parking areas and trailhead improvements at major entry points.
WSA would be closed to motorized and mechanized use year-round, except for area around Reynolds Pond.

Bend/Redmond
Under Alternative 6, the Bend/Redmond area would be managed similarly to Alternative 3; however, Alternative 6 does not include motorized trails north of State Highway 126. Under Alternative 6, this northern area would be designated as Limited to designated roads only, with year-round use.

Area south of State Highway 126 would be designated as Limited to designated roads and trails. Area north of State Highway 126 would be Limited to designated roads only.

Cline Buttes
Motorized use would be limited to designated roads and trails. The Cline Buttes block would be managed with an emphasis on multi-use trails in the center and north portions of the area. Designated trails would be provided for non-motorized use throughout the entire block. Like motorized users, Equestrians and mountain bikes would be limited to a designated trail system

Entire Cline Buttes block would be Limited to designated roads and trails.

Horse Ridge
This alternative would be the same as Alternative 5.

La Pine
This alternative would be the same as Alternative 3, except isolated public land blocks within the La Pine area would be managed as Closed to motor vehicles. These blocks generally range from 40 acres to 500 acres in size

Mayfield
This alternative would be the same as Alternative 4

Millican Plateau
A smaller area is Closed to motor vehicles adjacent to, and west of the Crooked River.
A buffer area around Powell Butte RNA that would be Limited to designated roads only.
The area north of Reservoir Road, east of Johnson Market Road, and west of Crooked River would be designated as Limited to designated roads and trails, except:
1. A buffer area ½-mile from Crooked River Canyon rim.
2. Area surrounding eastern portion of Powell Butte RNA limited to designated roads only (see Map 13).

North Millican
Alternative 6 separates recreational uses to a greater degree, and places greater restrictions on recreation use to benefit wildlife species than Alternative 5. Under Alternative 6, approximately 5,000 acres of the existing North Millican OHV area would be managed as a non-motorized use area, with designated, non-motorized trails. The remainder of the area would be managed for seasonal motorized use, with the area closed to motorized use from December 1 through April 30th, annually. As in all the other action alternatives, the trail system in the area would be revised to maintain a functional system on both sides of West Butte Road, if the road becomes a paved, truck route. The number of trail crossings of West Butte Road would be reduced, and a frontage trail may be needed to collect trail use and lead it to a smaller number of grade separated crossings.

The area would be managed as Limited to designated roads and trails, seasonally (closed

December 1 through April 30), except for an approximately 5,000 acre area managed as Closed to motorized vehicles (see Map 13).

Northwest
The area would be managed with an emphasis on development of non-motorized, designated trails that provide connectivity to a regional trail system, links to Sisters Community trails, and links to non-motorized trail systems on Crooked River National Grasslands (CRNG) to the north. Motorized use would be limited to designated roads only in the main block, and would be prohibited in the isolated parcels west of Squaw Creek (except in a designated entry into the Sisters Bouldering Area). A seasonal restriction on motorized use would be in place, consistent with adjacent policy on the CRNG; however, the area remains open year-round for non-motorized use. Non-motorized trails and additional trailheads to serve them are provided. The Sisters Bouldering Area would be managed specifically for climbing use, and would be identifiable as BLM managed land.

Motorized travel in main block would be Limited to designated roads. All BLM roads in this area would be Closed to motorized use seasonally, from December 1 to March 31. Isolated parcels west of Squaw Creek would be Closed to motorized travel, except for Sisters Bouldering Area.

Prineville
This alternative changes the management emphasis of the area, changing the management of the small, isolated tracts of BLM managed land north of Prineville to motorized use on designated roads only. The larger blocks of BLM land in this area would be managed as Limited to designated roads and trails year-round. The lands to the south of Prineville and north of Prineville Reservoir would be managed for use on designated roads only, or for use on designated roads and trails.

Motorized access on designated roads would be retained in the Eagle Rock area – providing access to Rockhounding sites.

Prineville Reservoir
The area is managed for motorized vehicle use on designated roads seasonally, with lands around the north and south side of the upper portion of Prineville Reservoir Closed to motor vehicles from December 1 to April 30. The area immediately east of the Crooked River and north of the reservoir is Closed to motor vehicles year-round. Lands at the south end of this area, furthest away from Prineville Reservoir are Limited to motorized use on roads only.

The area north of Prineville Reservoir and immediately east of the Crooked River would be designated Closed to motor vehicles. The area north of the upper end of Prineville Reservoir would be designated as Limited to designated roads, seasonally (Closed from December 1 to April 30). The area east of State Highway 27 is Limited to designated roads year-round.

Smith Rock
This alternative would be the same as Alternative 2.

South Millican
This alternative would be the same as Alternative 5, except the area would be seasonally Closed to motorized use from March 15 to September 15.

Steamboat Rock
This alternative would be the same as Alternative 3.

Tumalo

This alternative would be the same as Alternative 3, except that it places an emphasis on connections to regional trails.

Transportation and Utilities

Alternative 6 would consolidate transportation and utility systems with consideration for ecological and recreational values, while providing for regional transportation systems and meeting regional objectives.

Alternative 6 identifies 54 percent of the planning area in a primary wildlife emphasis designation and 38 percent in either a non-motorized emphasis or non-motorized exclusive designation. The recreation designations may or may not be included in the primary wildlife emphasis designation. Refer to the Recreation and Wildlife Emphasis maps for specific locations.

Land Ownership

This alternative is the same as Alternative 5, except the priorities for rural and urban lands are reversed. The alternative prioritizes land actions in the urban areas. It directly emphasizes recreation and indirectly wildlife; because most recreation activities involving land ownership would have corresponding activities involving wildlife. The alternative does not prioritize wildlife before recreation. Community needs would be emphasized in the rural area, where few requests originate and only as a secondary priority. An emphasis on management ease or land patterns would be coincidental with recreation or wildlife activities in the same location.

This alternative would designate the lands in Map 33 as Z-1 (approximately 344,376 acres) in the more urban areas to provide for intensive recreational uses, and lands in the more rural areas to provide for moderate recreational uses. Blocks of public lands identified as Z-1 include Tumalo, Cline Buttes, Steamboat Rock, Bend/Redmond Core, Smith Rocks, Mayfield, Badlands, Horse Ridge, Reservoir West, Reservoir East, Southeast, and Highway. In La Pine, Z-1 lands would be north and east of Wickiup Junction. Other, smaller parcels of public land include Grizzly Mountain and Juniper Canyon.

Approximately 39,694 acres would be designated for retention with the option of disposal. Isolated and fringe public parcels have also be identified as Z-2 to provide connectivity between larger blocks and eliminate trail and road entries onto private lands in the rural areas. These parcels are located around Alfalfa, east of Juniper Acres, east of Millican, and Skelton Cave. The majority of the public lands in La Pine are Z-2, extending south from Wickiup Junction to the boundary of the project area. Parcels were not specifically selected to correspond with private parcels desired for acquisition.

Lands designated for disposal (Z-3) would encompass approximately 14,222 acres. Parcels suitable for disposal include isolated parcels between Bend and Redmond, isolated parcels in and northwest of Redmond including the Redmond Caves, isolated and fringe parcels around Prineville, and a fringe parcel on the Powell Buttes block. Four parcels designated as Z-3 in La Pine are located west of Wickiup Junction.

Alternative 6 would also designate the lands in Map 33 as Community Expansion (CE) lands (approximately 5,115 acres). The public lands identified for community expansion near Redmond are located east of Redmond and west of the North Unit Canal, south of Redmond Airport, and south of Redmond and east of Highway 97. Public lands identified for a park are between Eagle Crest Phase II and Phase III and south of Highway 126. Public lands identified for a park are east of Prineville, at Barnes Butte. Public lands identified for a park and public facilities are south of Bend Airport. Two

40-acre parcels in Juniper Acres Subdivision were identified for parks. Three parcels selected for parks and public facilities are in La Pine.

This alternative would emphasize designating parcels for acquisition to improve wildlife connectivity and to provide public access. Parcels of interest include those between Smith Rock and Bend/Redmond, Tumalo and Cline Buttes, Northwest and Cline Buttes, Bend/Redmond and Cline Buttes, Mayfield, and the Badlands.

Public Health and Safety

Compared with Alternatives 3-5, Alternative 6 would reduce the acreage closed to all firearm discharge, only continuing closures associated with ACECs. Alternative 6 would also close less acreage to firearm discharge unless legally hunting (14%); closures of this second type would remain in urban parcels, the Badlands area, and lands near the Crooked River WSR.

In this alternative, the areas identified in Table 2-62a would be closed to all firearm discharge. Those areas in Table 2-62b would be closed to firearm discharge unless legally hunting.

Table 2-62a: Closed to all firearm discharge

Cline Buttes	Canal ACEC
Bend Redmond Block	BLM land southwest of McGrath Road including Historic Roads ACEC

Table 2-62b: Closed to firearm discharge unless legally hunting

Northwest Block	All BLM land not closed to all firearm discharge CTA Alts 2 - 7
Tumalo Block	700-acre parcel south of Tumalo Reservoir Road, Main block north of Tumalo Reservoir
Mayfield Block	Airport parcel
Prineville Reservoir Block	BLM lands contiguous and east of Lower Crooked WSR and contiguous and west of BOR/Prineville Reservoir
Horse Ridge Block	North of Rickard Road, South of Hwy. 20, BLM land between new and old Highway 20
Badlands Block	entire block except ¼ mile around Badland Rock from March 1 to August 31
North Millican Block	Dry Canyon just north of Highway 20

Alternative 7 (Preferred Alternative)

Alternative 7 would provide for ecosystem health and diversity by focusing efforts on maintenance and restoration of historic conditions as described under the Key Concepts, and would anticipate higher amounts of treatment acres, especially prescribed fire acres, than alternatives with a current distribution emphasis. Alternatives 3, 6, and 7 would have this same emphasis. Alternative 7 would increase the amount of primary and secondary wildlife habitat emphasis in the planning area from current direction to about 69 percent of the planning area.[30] There would be no additional management direction over that Common to Alternatives 2 - 7 for riparian areas or water quality or quantity, but Alternative 6 would include a change in Special Management Areas. This alternative would not include any new ACEC designations for Old Growth Juniper Woodlands ACECs, relying instead upon the overall conservation approach that is Common to Alternatives 2 - 7. The Cline Buttes area would include expanded area for the Peck's Milkvetch ACEC, but reduced from Alternatives 5 and 6. Alternative 7 would include expanding it by about 6,000 acres. This boundary (modified from Alternatives 5 and 6) would exclude areas in the north where plant populations have not been found. Alternative 7 would also include the Tumalo Canals ACEC identified as Common to Alternatives 2 - 7, but would not include the designation of a scenic ACEC for the Smith Rock area.

Alternative 7 would reduce areas available for livestock grazing in over those identified in Alternative 1 by up to about 109,000 acres, reducing available AUMs by about 17% percent. About half of these acres would still be available as Reserve Forage Allotments, but the AUMs would not be allocated to specific permittees. Most closures would be dependent on permittees voluntarily relinquishing permits.

This alternative would be similar to Alternative 2 regarding the area available for salable minerals. The Peck's Milkvetch ACEC designation indicates a greater potential for increased cost or limited availability of mineral materials within those areas, but does not prohibit specific development. The area removed from the proposed expansion of the Peck's Milkvetch ACEC described in Alternatives 5 and 6 includes existing and potential aggregate sites with a lower potential for conflict than other known sites.. There would be fewer acres available for mineral sales over those identified in Alternative 1 by about 15 percent.

Estimated forest or range products are based on the expected amount of treatment acres (in addition to the Wildland-urban interface (WUI) treatments identified as Common to Alternatives 2 - 7), and are expected to be at about 150,000 cubic feet (750,000 board feet) for Alternatives 3, 6, or 7, more than that available under alternatives 2, 4, or 5. Alternative 7 would nearly double the area available for permanent long-term military use over Alternative 1, and would include a series of rotational areas for periodic training exercises.

The recreation emphasis in Alternative 7 would reduce the amount of multi-use shared facilities compared to Alternative 1 to about 38 percent of the planning area, with a reduced emphasis on managing separate uses in the same areas compared to Alternative 6. Areas managed exclusively for or with a non-motorized emphasis for trails would be increased over Alternative 1 from three percent to about 43 percent, with a greater emphasis on non-motorized emphasis areas (which provide motorized use on roads, non-motorized on trails)than on exclusive non-motorized areas. About 76 percent of the

[30] For this comparison, areas designated as critical habitat in the Brothers - La Pine Resource Management Plan or as a result of other cooperative designations like winter closure areas were assumed to reflect a "primary" designation as used by the Upper Deschutes RMP.

geographic areas would emphasize recreation on designated motorized roads or roads and trails, with about 60 percent of the area available for motorized use on designated roads and trails during the winter use season.

Alternative 7 has the least amount of land designated for retention (Z-1) than any of the alternatives save Alternative 1. Alternative 7 has the most lands available for retention with the possibility of exchange (Z-2) of all of the alternatives except No Action. The total amount of land classified for disposal (Z-3) is the lowest of all of the alternatives at about 1% of the planning area. Lands classified as Community Expansion (CE) lands are similar but about 1,000 acres less than Alternative 1 at about 1% of the planning area, and include limitations on future uses of the land adjacent to the proposed transportation corridor between Redmond and Bend Community Expansion lands for parks, open space, and open community infrastructure needs.

Designated transportation systems would be altered over those in Alternative 1 and 2 by the addition of a transportation corridor south of Redmond to Deschutes Junction that would include a connection to Highway 97 near Quarry Road. This road configuration would be the same for Alternatives 4-7. As in Alternative 3, this alternative would designate existing roads to serve as future collectors in the BLM system. By changing the designation of some existing collector roads to local roads, additional roads fall into a category that would make them available either for future designation or closure, depending upon resource conditions and demands. Alternative 7 would anticipate future local road densities lower or seasonally restricted in areas of high wildlife emphasis, or areas designated for non-motorized emphasis. In accordance with elements common to Alternatives 2 - 7, designation of a new transportation corridor would anticipate future relinquishment of a similar amount of historic roads in the Bend-Redmond geographic area.

Alternative 7 firearm discharge management would close the most acreage to all firearm discharge of any alternative (3% of the planning area), including additional closures above Common to Alternatives 2 - 7 management in urban, high-use areas. However, Alternative 7 would close less acreage to firearm discharge unless legally hunting than Alternatives 3 and 5. This alternative would emphasize management in the Badlands area, Steamboat Rock, the Crooked River WSR, the Tumalo Block, and parts of Cline Buttes.

Ecosystem Health and Diversity

Vegetation

Same as Alternative 3, except there would be no designations of ACECs specifically for old-growth juniper woodlands.

Wildlife

Planning Area

Alternative 7 would restore terrestrial source habitats to provide for species needs with a focus toward biological diversity. This alternative would provide direction to increase the geographic extent of Vegetation cover type and structural stages that have declined substantially from the historical to the current period within most geographic areas. It would also re-pattern the Vegetation patches so they are consistent with disturbance regimes and with the landform, climate, and biological and physical characteristics of the ecosystem. General wildlife habitat emphasis by geographic area is displayed in Table 2-63, Wildlife Emphasis Summary, Alternative 7:

Table 2-63:

Wildlife Emphasis Areas - Alternative 7

	Primary Percent / # acres	**Secondary** Percent / # acres	**Minor** Percent / # acres	**Totals** Percent / # acres
All Wildlife Emphasis Areas	61% / 243,918 ac.	8% / 32,975 ac.	31% / 126,438 ac.	100% / 403,331 ac.
Golden Eagles	73% / 29,161 ac.	7% / 2,646 ac.	20% / 8,161 ac.	100% / 39,968 ac.
Sage Grouse	100% / 77,601 ac.	0% / 0 ac.	0% / 0 ac.	100% / 77,601 ac.
Elk	74% / 132,563 ac.	3% / 4,992 ac.	24% / 42,616 ac.	100% / 180,171 ac.
Deer	75% / 197,085 ac.	4% / 10,817 ac.	21% / 55,367 ac.	100% / 263,269 ac.
Pronghorn	46% / 76,842 ac.	15% / 25,350 ac.	39% / 64,997 ac.	100% / 167,189 ac.
Migration and Connectivity	79% / 54,857 ac.	4% / 2,512 ac.	18% / 12,476 ac.	100% / 69,845 ac.

Geographic Areas

Alternative 7 would establish specific direction for the following geographic areas (see page 36-37 for a description of primary, secondary and minor wildlife emphases). Wildlife habitat emphases by geographic area and specific to species of local importance can be found on Tables 2-64 – 2-70, Wildlife Emphasis Areas, Alternative 7, below. This alternative would manage approximately 61 percent of the planning area with a primary emphasis, 8 percent with a secondary emphasis, and 31 percent with a minor emphasis for wildlife (see Table 2-1).

Hydrology

This alternative would be the same as Alternative 3.

Special Management Areas

Areas of Critical Environmental Concern (ACECs)
Alternative 7 would designate one new ACEC (in addition to ACEC proposals in Common to Alternatives 2 - 7), the Peck's Milkvetch ACEC Addition. This ACEC addition is similar to that proposed under Alternatives 5 and 6 except that the boundary has been modified to exclude a portion of the northeast corner to accommodate the possibility of other land uses in this area. After modification for potential minerals extraction, this ACEC proposal encompasses an area of 14,227 acres which would be added to the original Peck's Milkvetch ACEC to create an expanded ACEC. Objectives, guidelines and probable actions for this ACEC have been discussed under Alternatives

Table 2-64. Wildlife Emphasis Areas - Alternative 7 - Mule Deer.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29579	12	0	29591
	99.96%	0.04%	0.00%	
Cline Buttes	0	3515	11752	15267
	0.00%	23.02%	76.98%	
Horse Ridge	24768	0	0	24768
	100.00%	0.00%	0.00%	
Mayfield	1040	551	0	1591
	65.37%	34.63%	0.00%	
Millican Plateau	9118	0	43565	52683
	17.31%	0.00%	82.69%	
North Millican	53767	0	0	53767
	100.00%	0.00%	0.00%	
Prineville	4311	4263	0	8574
	50.28%	49.72%	0.00%	
Prineville Reservoir	37119	2357	0	39476
	94.03%	5.97%	0.00%	
Smith Rock	2110	0	0	2110
	100.00%	0.00%	0.00%	
South Millican	17554	0	0	17554
	100.00%	0.00%	0.00%	
Northwest	6626	119	0	6745
	98.24%	1.76%	0.00%	
Steamboat Rock	5301	0	50	5351
	99.07%	0.00%	0.93%	
Tumalo	5792	0	0	5792
	100.00%	0.00%	0.00%	
TOTAL	**197085**	**10817**	**55367**	**263269**
	74.86%	**4.11%**	**21.03%**	

Table 2-65. Wildlife Emphasis Areas - Alternative 7 - Rocky Mountain Elk.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29604	12	0	29616
	99.96%	0.04%	0.00%	
Cline Buttes	0	4,192	24,965	29,157
	0.00%	14.38%	85.62%	
Horse Ridge	5483	0	0	5483
	100.00%	0.00%	0.00%	
Lapine	26504	0	4204	30708
	86.31%	0.00%	13.69%	
Mayfield	3	438	0	441
	0.68%	99.32%	0.00%	
Millican Plateau	2207	0	12898	15105
	14.61%	0.00%	85.39%	
North Millican	34674	0	0	34674
	100.00%	0.00%	0.00%	
Prineville	761	179	0	940
	80.96%	19.04%	0.00%	
Prineville Reservoir	11639	52	0	11691
	99.56%	0.44%	0.00%	
South Millican	4833	0	0	4833
	100.00%	0.00%	0.00%	
Northwest	6626	119	0	6745
	98.24%	1.76%	0.00%	
Steamboat Rock	4421	0	549	4970
	88.95%	0.00%	11.05%	
Tumalo	5808	0	0	5808
	100.00%	0.00%	0.00%	
TOTAL	**132,563**	**4,992**	**42,616**	**180171**
	73.58%	**2.77%**	**23.65%**	

Table 2-66. Wildlife Emphasis Areas - Alternative 7 - Golden Eagle.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Bend/Redmond	0	128	0	128
	0.00%	100.00%	0.00%	
Cline Buttes	1,796	1,659	1,949	5,404
	33.23%	30.70%	36.07%	
Horse Ridge	2158	1	0	2159
	99.95%	0.05%	0.00%	
Millican Plateau	3114	534	5858	9506
	32.76%	5.62%	61.62%	
North Millican	4860	0	0	4860
	100.00%	0.00%	0.00%	
Prineville	1605	324	0	1929
	83.20%	16.80%	0.00%	
Prineville Reservoir	7062	0	0	7062
	100.00%	0.00%	0.00%	
Smith Rock	997	0	0	997
	100.00%	0.00%	0.00%	
South Millican	513	0	0	513
	100.00%	0.00%	0.00%	
Northwest	1038	0	0	1038
	100.00%	0.00%	0.00%	
Steamboat Rock	3950	0	354	4304
	91.78%	0.00%	8.22%	
Tumalo	2068	0	0	2068
	100.00%	0.00%	0.00%	
TOTAL	**29,161**	**2,646**	**8,161**	**39968**
	72.96%	**6.62%**	**20.42%**	

Table 2-67. Wildlife Emphasis Areas - Alternative 7 - Pronghorn.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	9368	12	0	9380
	99.87%	0.13%	0.00%	
Bend/Redmond	0	9	25939	25948
	0.00%	0.03%	99.97%	
Horse Ridge	19384	0	0	19384
	100.00%	0.00%	0.00%	
Mayfield	4369	20324	4	24697
	17.69%	82.29%	0.02%	
Millican Plateau	1860	563	38813	41236
	4.51%	1.37%	94.12%	
North Millican	24520	0	0	24520
	100.00%	0.00%	0.00%	
Prineville	0	2890	241	3131
	0.00%	92.30%	7.70%	
Prineville Reservoir	0	1552	0	1552
	0.00%	100.00%	0.00%	
South Millican	17341	0	0	17341
	100.00%	0.00%	0.00%	
TOTAL	**76842**	**25350**	**64997**	**167189**
	45.96%	**15.16%**	**38.88%**	

Table 2-68. Wildlife Emphasis Areas - Alternative 7 - Sage grouse.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Horse Ridge	14356	0	0	14356
	100.00%	0.00%	0.00%	
Millican Plateau	1943	0	0	1943
	100.00%	0.00%	0.00%	
North Millican	44412	0	0	44412
	100.00%	0.00%	0.00%	
Prineville Reservoir	19	0	0	19
	100.00%	0.00%	0.00%	
South Millican	16871	0	0	16871
	100.00%	0.00%	0.00%	
TOTAL	**77601**	**0**	**0**	**77601**
	100.00%	**0.00%**	**0.00%**	

Table 2-69. Wildlife Emphasis Areas - Alternative 7 - Migration and Connectivity Corridors.

Geographical Area	Species	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
La Pine	Deer	34225.2	0	6417.9	40643.1
		84%	0%	16%	
Badlands	Pronghorn	1778	11.8	0	1789.8
		99%	1%	0%	
Mayfield Pond	Pronghorn	3013.7	1897.6	0	4911.3
		61%	39%	0%	
Millican Plateau	Pronghorn	3221	483	6058.4	9762.4
		33%	5%	62%	
North Millican	Pronghorn	4039	0	0	4039
		100%	0%	0%	
Research Natural Area	Pronghorn	510.2	0	0	510.2
		100%	0%	0%	
Subtotals for Pronghorn		**12561.9**	**2392.4**	**6058.4**	**21012.7**
		60%	**11%**	**29%**	
Prineville	Elk	0	67.5	0	67.5
		0%	100%	0%	
Prineville Reservoir	Elk	8070	51.8	0	8121.8
		99%	1%	0%	
Subtotals for Elk		**8070**	**119.3**	**0**	**8189.3**
		99%	**1%**	**0%**	
TOTAL		**54857.1**	**2511.7**	**12476.3**	**69845.1**
		79%	**4%**	**18%**	

Table 2-70. Wildlife Emphasis Areas - Alternative 7 - All Species' Habitats.

Geographical Area	Primary acres/%	Secondary acres/%	Minor acres/%	TOTAL
Badlands	29604	12	0	29616
	99.96%	0.04%	0.00%	
Bend/Redmond	1326	421	40399	42146
	3.15%	1.00%	95.85%	
Cline Buttes	0	4192	27672	31864
	0.00%	13.16%	86.84%	
Horse Ridge	25167	0	0	25167
	100.00%	0.00%	0.00%	
Lapine	34773	0	6418	41191
	84.42%	0.00%	15.58%	
Mayfield	6352	20659	4	27015
	23.51%	76.47%	0.01%	
Millican Plateau	9118	603	46564	56285
	16.20%	1.07%	82.73%	
North Millican	54254	0	0	54254
	100.00%	0.00%	0.00%	
Prineville	7008	4612	241	11861
	59.08%	38.88%	2.03%	
Prineville Reservoir	37119	2357	0	39476
	94.03%	5.97%	0.00%	
Smith Rock	2119	0	0	2119
	100.00%	0.00%	0.00%	
South Millican	17687	0	0	17687
	100.00%	0.00%	0.00%	
Northwest	6626	119	0	6745
	98.24%	1.76%	0.00%	
Steamboat Rock	6957	0	5140	12097
	57.51%	0.00%	42.49%	
Tumalo	5808	0	0	5808
	100.00%	0.00%	0.00%	
TOTAL	**243918**	**32975**	**126438**	**403331**
	60.48%	**8.18%**	**31.35%**	

5 and 6. The mineral and rockhounding guidelines for Peck's Milkvetch ACEC would be the same as Alternatives 5, and would be the same as Alternative 2 for Tumalo Canal ACEC.

Acres designated as ACEC (existing and new) under Alternative 7 total 30,164.

Caves

Pictograph Cave would be closed seasonally (October 15 – May 1) for bat hibernacula and other resource values. The cave would be closed to the installation of bolted climbing routes. All existing bolts and climbing hardware would be removed and the cave would be managed under Leave No Trace principles. The use and/or possession of chalk or visually apparent hand-drying agents would also be prohibited in Redmond Caves.

Land Uses

Livestock Grazing

In this alternative the BLM would use a formula to estimate potential for conflict and demand to help identify where problems are likely to occur (for additional details of how this formula works see Common to 2-7 section in this chapter, and Chapter 4 livestock grazing assumptions). This formula is changed somewhat from alternatives 2-6; most notably, an ecological conflict factor is added, and allotments would not be placed in "closed" or RFA status in most cases, unless the grazing permittee voluntarily relinquishes his or her permit. In this alternative, livestock grazing would be modified as directed in Table 2-71 when thresholds of conflict and demand are exceeded. Appendix G shows which allotments would be affected.

Some allotments would be placed in Reserve Forage Allotment (RFA) status. These allotments would not be allocated to a specific grazing operator. The BLM would allow temporary, non-renewable use to federal permit holders when there is a demonstrated need to rest the permittee's allotment. "Need" for rest would include but not be limited to the following reasons: Prior to prescribed fire or necessary fence construction, or during/after rehabilitation projects, wildfire or prescribed fire, drought, flood, insect damage, or disease. Use would meet goals described for area in RMP and, if applicable, in AMP.

Minerals

This alternative would be the same as Alternative 6 regarding mining of saleable minerals, reducing mining conflicts with recreation and wildlife habitat in "rural" areas, and manage conflicts with residents as in Alternative 2. In Alternative 7, approximately 332,774 acres would be available for mineral material sales. Mineral material sales may not be located within 1/8 mile of residentially zoned areas. In addition, roads that feed from BLM-administered land into residentially zoned areas may be used for mining-related traffic only if alternate routes are not available. Mineral material sales may not occur within 1/8 mile of designated recreation sites in "urban" areas, nor within ½ mile of designated recreation sites in "rural" areas. Seasonal restrictions on all mineral operations would apply to 66,746 acres and surface occupancy for fluid mineral leasing would not be allowed on 51,414 acres (see Map S-28, Minerals Alternative 7).

Military Uses

This alternative allows for addition of new training lands in order to reduce concentration of military training on remaining lands. Alternative 7 also promotes the restoration of the area by making additional lands available for permanent and temporary use.

Table 2-71. Grazing Decision Matrix, Alternative 7, preferred alternative

		LEVEL OF CONFLICT -- SOCIAL & ECOLOGICAL								
		Low Ecological	Low Ecological	Low Ecological	Moderate Ecological	Moderate Ecological	Moderate Ecological	High Ecological	High Ecological	High Ecological
		**********	**********	**********	**********	**********	**********	**********	**********	**********
		Low Social	Moderate Social	High Social	Low Social	Moderate Social	High Social	Low Social	Moderate Social	High Social
LEVEL OF DEMAND	Low Demand	Open	IPR, close or create RFA	IPR, close or create RFA	IPR, create RFA	IPR, close	IPR, close	IPR, close	Close	Close
	Moderate Demand	Open	Open	IPR, create RFA	Open	IPR, close or create RFA	IPR, close	IPR, close or create RFA	IPR, close	IPR, close
	High Demand	Open	Open	IPR, Open or create RFA	Open	IPR, Open or create RFA	IPR, create RFA	IPR, Open or create RFA	IPR, create RFA	IPR, close or create RFA

Explanation:

IPR = "If permit is relinquished"
RFA = Reserve Forage Allotment
"Close" means discontinue livestock grazing for the life of the plan. Would still allow "prescribed" grazing (administrative use).
All Allotments except "close" remain open unless permit is relinquished.
For any "close," BLM would provide 2 years notice of cancelation, unless waived by permittee.
Additional direction under Livestock Grazing Common to Alternatives 2-7 also applies.

Military use is allowed as shown in Map 36 (approximately 27,934 acres). The military training area permitted in this alternative would be south of O'Neil Highway, crossing Highway 126 and Powell Buttes Highway. It would also be south of Roberts Field and Deschutes County. From north to south, the permitted area would remain east of the North Unit Canal, except for the area south of the Airport and north of Pronghorn resort. It would be north of BLM road 6589-B. The permitted area would be west of the private land ownership in the rural community of Powell Buttes.

This alternative would designate three rotational training areas (approximately 20,054 acres) so that one training area would be available for training for a specific duration, estimated at three years per area. The three areas currently under consideration are Steamboat Rock about 3,820 acres; five miles south of Prineville Airport to five miles north of the Millican Road/Reservoir Road Intersection (Four Corners), about 7,060 acres; and five miles north of the Millican Road/Reservoir Road Intersection to that intersection, about 9,388 acres.

Recreation

The Preferred Alternative generally emphasizes recreation use that is managed for lower conflicts with wildlife in the areas away from population centers. The central portions of the planning area closest to Bend and Redmond often have recreation management goals that allow for higher levels of use and thus conflicts between recreational users and with adjacent landowners, as well as conflicts with wildlife management.

Alternative 7 differs from Alternative 6 by providing winter OHV trail riding opportunities in the North Millican area, albeit at a greatly reduced trail system. Like Alternatives 5 and 6, this alternative provides a relatively high mixture of different recreation opportunities and varying management strategies/intensities. As compared to Alternative 6, a slightly smaller portion (37 percent) of the planning area is still managed for multiple use, primarily on shared roads and trails (Millican Valley and Bend/Redmond areas). The reduction is a result of the Mayfield block's management changing to a roads only emphasis. Alternatives 6 and 7 provide about the same amount of lands managed for motorized use on roads only, while providing non-motorized trail opportunities. These areas would include the Northwest (Squaw Creek), and Skeleton Fire areas; and the area south of Prineville Reservoir. Alternative 6 closes the highest percentage of the area to motorized use year-round (19.5 percent) of any alternative. While most of these areas would be managed for non-motorized trail use, with the exception of the Badlands, these areas are relatively small and would not allow very lengthy trail systems for mountain bikes or horses. This alternative proposes one of the most intensive and high cost management strategies for Cline Buttes, providing separate trails and/or separate areas for motorized and non-motorized trail users. Motorized use is concentrated in the middle and north portion of the Cline Buttes block, and would likely result in increased conflicts between recreational visitors and private landowners. Like many other alternatives, the Steamboat Rock management strategy is also extremely management intensive. No opportunities for motorized use exist surrounding a broad area around Prineville Reservoir.

Alternative 7 represents a large shift in management emphasis for the La Pine area, changing from the present management of an Open designation to a more intensive management strategy that includes area with designated roads and trails, areas with motorized use on designated roads only, and areas where motorized use is not allowed seasonally (see Map 21, Recreation Emphasis – Alternative 7).

Group Use/Special Recreation Permits

Activities outside of the following guidelines for group and commercial use may be permitted based on additional NEPA analysis. That analysis would examine numerous factors including but not limited to effects to:

1. natural and cultural resources
2. recreation experience
3. recreation structures and facilities

Commercial Use

Special Recreation Permits for trail dependent annual use (e.g., guided horseback rides, llama pack trips, guided hikes, mountain bike tours etc.) would only be issued for designated trails that are part of BLM's transportation system.

Organized Group Use

If the BLM determines that use levels in an area is likely to exceed the capacity of facilities such as trailheads, staging areas, and other facilities a reservations system may be developed to meet growing demands for group uses such as group camping, day use for special events, etc., without exceeding the capacity of existing facilities.
SRPs would be required for all organized group activities involving greater than 20 participants.

Wilderness Study Areas

Steelhead Falls

Organized group use for the Steelhead Falls area would have the following restrictions:

- No organized group use on holiday weekends
- 1 group/day maximum
- 12 people/group maximum
- 6 cars/group maximum
- In the Steelhead Falls Area - travel limited to hiking.
- In the Foley Waters Area - travel limited to hiking or equestrian use.

Badlands

Organized group use in the Badlands would have the following restrictions:

- 20 people/group maximum
- Group parking must occur outside the WSA boundary, and/or groups utilizing Milepost 16, County Line Road, or Obernolte Road trailheads would park outside the trailhead parking areas.

Horse Ridge

Organized group use in the Horse Ridge area would have the following restrictions:

- SRPs would be required for all organized group activities involving greater than 12 participants.
- Trail dependant special recreation events (trail rides, races, etc.) would be allowed on designated roads and trails. A maximum of two events (motorized or non-motorized)

could be held per month, with events up to two days long allowed. Each permitted event would be separated by at least 12 days with no scheduled events.

Geographic Areas

Badlands
Under The Preferred Alternative, the Badlands WSA would be managed for primitive, non-motorized recreation. The WSA would be closed to motor vehicle use year-round. Due to the vehicle closures, a high priority would be given to providing designated parking areas and trailhead improvements at major entry points (this includes travel management and trailhead improvements outside the WSA, including in the Mayfield area and in the North Millican area at the base of Dry Canyon).

The existing inventoried system of routes that connect to the following trailheads (Obernolte, Route 5, Milepost 16, and Route 8) would be retained. A designated, signed trailhead at Milepost 12 would not be provided. A non-motorized trail entrance at the east boundary of the Badlands would be provided as a walk-over only. For direction on parking/trailhead improvements, see plan guidance for the Mayfield and North Millican areas.

The entire WSA would be Closed to motorized vehicle use.

Bend/Redmond
Under this alternative, the Bend/Redmond area would be managed for motorized use on designated roads and trails, both north and south of State Highway 126. Due to its small size, proximity to Redmond and repeated problems with dumping and resource damage, the area north of State Highway 126 and west of the North Unit Canal would be Closed to motorized use.

A multi-use trail system would be developed in the Bend-Redmond block. The trail system would be developed to create a system that could function with portions closed if needed to minimize conflicts with OMD training exercises. The road system needed for OMD use and other administrative uses would be retained. The road and trail system goal for the main block would be limited to a range of approximately 3.0 to 5.0 miles per square mile.

The entire area would be designated as Limited to designated roads and trails, open year-round, with the exception of:

- The 1,360 acre Historic Roads ACEC
- The area north of State Highway 126 and west of the North Unit Canal

Cline Buttes
The Cline Buttes area would be managed for multiple recreation use, with some areas being designated specifically for non-motorized trail development, while other areas would have multiple use trails.

The Cline Buttes block would be managed with an emphasis on multi-use trails in the center and north portions of the area. The dry canyon area along Fryrear Road and the area between Barr Road and Cline Falls Highway would be managed to emphasize non-motorized trail use. The Maston Allotment area east of Cline Falls Highway would be managed exclusively for non-motorized use. Like motorized users, Equestrians and mountain bikes would be limited to a designated trail system.

Roads would be retained or developed in the Cline Buttes block to the extent necessary to provide for needed administrative access and create a reasonable and identifiable

loop system for public use, particularly in the area between Barr Road and Fryrear Road. Only the minimum number of roads needed for administrative access would be retained in the Maston Allotment. All other roads in this area would be either managed as designated non-motorized trails or closed and rehabilitated. Trail development in the higher elevation areas of Cline Buttes would be oriented toward providing non-motorized trails for hiking, mountain biking and equestrian use, with an emphasis on providing a loop system encircling the buttes. The central and northern portions of Cline Buttes would contain multi-use trails. Roads and trails open for year-round motorized use would be located to minimize conflicts with adjacent landowners to the maximum extent possible. The road and trail density goal for Cline Buttes (excluding the Maston Allotment) would be would be limited to a range of approximately 2.0 to 3.0 miles per square mile. The road and trail density goal for the Maston Allotment would be limited to a range of approximately 1.0 to 2.0 miles per square mile.

The following areas are designated as Limited to designated roads and trails, open year-round:

- The Cline Buttes block west of Cline Falls Highway, east of Fryrear Road, and north of State Highway 126
- The Cline Buttes block north of State Highway 126.

The following areas are designated as Closed to motor vehicles:

- The Cline Buttes block east of Cline Falls Highway (except for designated entry roads to parking areas and river access points)
- The Tumalo Canal ACEC.

This alternative would manage equestrian use on a designated trail system. Within the geographic subdivision, priority would be given to establishing a designated trail system within the Maston Allotment and the Canyon complex in the northwest portion of Cline Buttes. This alternative would also provide designated trail opportunities for mountain biking. Emphasis would be on providing designated trail opportunities in the higher elevation portions of Cline Buttes, provided legal access exists and trespass would be minimized. Designated access points, parking areas and trailheads would be identified to support the non-motorized trail system, and the number of access points would be limited through trail layout and rehabilitation efforts.

Horse Ridge

Under Alternative 7, the Skeleton Fire area would be managed for motorized use on a few main roads, much like it is today. One road segment closed after the Skeleton Fire would likely be reopened to provide a road loop accessible from both the Gosney Road and Old Highway 20 access points. A designated trails system would be provided for non-motorized use in the same area. Horse Ridge and the area between State Highway 20 and the old Highway would be managed for non-motorized trail use. The road and trail system goal for the Skeleton Fire area would be limited to a range of approximately 1.0 to 2.0 miles per square mile.

In addition to those areas that would be Closed in Common to Alternatives 2 - 7 (area around Conestoga Hills, Rickard Road area, and Horse Ridge ACEC/RNA) the following travel designations would apply to the Horse Ridge area:

- The Skeleton Fire area would be designated as Limited to designated roads.

- Horse Ridge area would be designated as Closed to motorized vehicles. This closure extends northwest into the area between State Highway 20 and the old highway 20 alignment (T18S, R14E, Sec. 30, 31,32; T19S, R14E, Sec. 5, 4, 3, 10; T18S, R13E, Sec. 25).

La Pine

The majority of the La Pine area would be managed for motorized use on designated roads only, with the southern third of the area closed to motorized use seasonally. The middle portion of the La Pine area east of State Highway 97 would be managed for motorized use on designated roads and trails year-round. This area would encompass the Rosland OHV Play area, and provide more opportunities for designated trails and links to roads or potential future trails on the Deschutes National Forest. The northern portion of the La Pine area would be managed for motorized use on designated roads only, with additional non-motorized trails being designated if a need arises or if adjacent trail opportunities are available at La Pine State Park. The focus on providing developed recreation opportunities is to explore R&PP lease options.

This alternative would remain the same as Alternative 6, except an area south of the Rosland OHV Play Area would be retained for motorized trail use and designated as Limited to designated roads and trails, open year-round.

Mayfield

The Mayfield area would be managed to provide separate geographic areas for motorized and non-motorized use, with the airport allotment and most of the area south of Alfalfa Market Road being managed exclusively for non-motorized trail use, and the area to the north of Alfalfa Market Road being managed for motorized use on a designated road system. Under this alternative, nearby motorized trail use opportunities would be available in the Millican Valley area and in the Bend/Redmond block.

Alternative 7 would be managed to provide multiple loops in the 19,399 acre area north of Alfalfa Market Road that can be used by both motorized and non-motorized recreationists, as well as provide workable access for permittees. The road system would be designed to provide several different length loops from the two designated road access points (one at Alfalfa Market Road and another at Powell Butte Highway). Rerouting of the existing road away from the edge of Mayfield Pond would be a priority. No other motorized access points would be available into the block. Designated roads would be located approximately ¼ to ½ mile from bordering subdivisions, including Cascade View Estates and Cimarron City. Road densities for the area would be limited to a range of approximately 1 to 2 miles per square mile. The travel management concept for the area would be a road loop system that emphasizes interior roads and more road mileage in the northern portion of the block. A large non-motorized trail loop would be provided in the periphery of the block, with connecting trails to provide loops on the interior area. Non-motorized trail connections would be considered at the surrounding subdivisions. Roads not designated would be rehabilitated.

The area south of Alfalfa Market Road, north and west of Dodds Road would be closed to motor vehicles, and the existing roads would be reconfigured into a non-motorized trail system. Access points would be created off Alfalfa Market Road and another off Dodds Road. The major trailhead parking area would likely be located off Alfalfa Market Road. Trail system goals would be to provide several different length loops for hiking, running, equestrian and mountain bike use.

The travel management emphasis for the area east of Dodds Road and west of the Badlands WSA would be to provide public access to Reynolds Pond, Alfalfa Pond, and the Route 5 entrance of the Badlands WSA. Roads would be retained to meet these access needs, while minimizing conflicts with adjacent landowners. A designated parking/

trailhead area would be developed at Reynolds Pond, with a trail link provided to the Badlands Route 5 trailhead. An entry road and parking area would be located further away from Alfalfa Pond, to minimize conflicts with adjacent residents.

Other roads in the area not needed for administrative access would be closed and rehabilitated. The road link to Badlands Route 5 entrance would be retained, and signed as a trail link from the Reynolds Pond parking area.

General public use, motorized access points into the area north of Alfalfa Market Road would be limited to allow better management of the area and a reduction in conflicts with adjacent landowners (e.g., one access point from Powell Butte Highway and one access point from Alfalfa Market Road). Access controls would be made to support the motorized vehicle closure south of Alfalfa Market Road (e.g., fences, signs, barriers, etc.). A parking area/trailhead would be provided for the closed area south of Alfalfa Market Road, to allow for parking. Day use improvements such as picnic tables, group use areas, etc. may be considered, and other access points would be provided to serve surrounding residential access, but would be minor access gates, without improved parking. Vehicle parking would be moved farther away from Alfalfa Pond, but would still be available off Dodds Road. This road would be retained for administrative access and may be improved to provide a well-marked vehicle access to the Route 5 trailhead for the Badlands WSA. The existing access road to Mayfield Pond would be relocated farther away from the pond to improve recreation and resource conditions at the pond site. Parking and trailhead facilities would also be provided at the Route 5 entrance to the Badlands WSA. BLM would consider the use of the access road from Dodds Road that also links to Alfalfa Pond. In general, the trailhead/parking area would be provided to accommodate horse trailers and be designed to minimize the spread or expansion of user created parking areas.

Millican Plateau

This alternative would manage the Millican Plateau area for year-round OHV use on a designated trail system. This alternative is similar to Alternative 3, except there would be a buffer area around Powell Butte RNA that would be limited to designated roads only. The majority of the area would be managed for year-round use on designated roads and trails. However, the small, isolated parcels and BLM lands to the east and immediately south of the Juniper Acres subdivision are either designated as Closed to motor vehicles or managed for use on designated roads only. The northern tip of the Millican Plateau area is closed to motor vehicles, in response to chronic dumping and vandalism problems between the BLM boundary and the powerline crossing at Millican Road (see Map 14). The area west of and adjacent to the Crooked River Canyon would be closed to motorized use, with the exception of a single trail loop that would access a river canyon viewpoint.

There would be an increase in the amount of area available for future trail designations by expanding the OHV trail system to incorporate areas to the west, east and north of the existing designated trail system. The goal of this expansion would be to improve management of areas currently limited to existing road and trails by designating specific trail systems, and to provide comparable opportunities in the North Millican and South Millican areas (from reduced densities or seasonal closures). The road and trail system densities for the area would be limited to a range of approximately 2.5 miles to 4.0 miles per square mile.

This alternative would designated the area east of Road 6555-b and west of the Crooked River as Closed to motor vehicles. The area immediately surrounding the Powell Butte RNA would be limited to designated roads, in order to maintain a separation between OHV use and the RNA. The northern tip of Millican Plateau would be closed

to motor vehicles (see Map 14) except for providing some trail access to a viewpoint. Isolated parcels located within and east of Juniper Acres subdivision are either closed to motorized use or limited to designated roads only (see Map 14).

North Millican

The Preferred Alternative would manage most of the area for shared use on a designated trail system. Certain areas, such as the dry canyon area along State Highway 20 and the area west of, and adjacent to State Highway 27, would not have any motorized trails designated in them. The designated trail system would be reduced in mileage and density over current conditions to allow for year-round, and especially winter, use. To reach a relatively low trail density, the travel management priority for the area would be given to trails, and all roads not needed for administrative access may be closed and rehabilitated. To reduce habitat fragmentation, the trail system layout would be designed to place trails in existing road or ROW corridors to the maximum extent possible. The trail system layout would also emphasize retention of large, unfragmented habitat blocks (in a range of 1,000 to 2,500 acres or greater) throughout the area. As in all the other action alternatives, the trail system in the area would be revised to maintain a functional system on both sides of West Butte Road, when the road becomes a paved road. The number of trail crossings of West Butte Road would be reduced, and frontage trails may be provided to collect trail use and lead it to a smaller number of grade separated crossings.

The road and trail system densities for the area would be limited to a range of approximately 1.5 miles per square mile. Trails located within existing road or ROW corridors (i.e., parallel to, and within ¼ mile or less from existing roads or ROWs) would not be calculated as separate trail or road miles in reaching density goals for the area. The interim road and trail system in North Millican would be the existing road and trail system implemented under the Millican Valley OHV Area Plan, with revisions made to the extent necessary to provide safe trail crossing locations of the upgraded Millican/ West Butte Road. The interim road and trail system would be subject to the existing seasonal closures that currently apply (Area closed from December 1 through April 30).

The area would be managed as Limited to designated roads and trails, open year-round, except for an area along State Highway 27 that would be managed as Limited to designated roads only (see Map 21). The Dry Canyon area in the northwest corner of North Millican area would be managed for equestrian, hiking, and mountain bicycling use on designated trails. Additional non-motorized trails may be considered to provide a loop trail incorporating dry canyon and the area to the north of dry canyon. A designated trail link would be provided from Dry Canyon to the Route 8 entrance to the Badlands WSA.

Northwest

The area would be managed with an emphasis on development of non-motorized, designated trails that provide connectivity to a regional trail system, links to Sisters Community trails, and links to non-motorized trail systems on Crooked River National Grasslands (CRNG) to the north. Motorized use would be limited to designated roads only in the main block (i.e., between Squaw Creek and McKenzie Canyon). Motorized use would be prohibited in the isolated parcels west of Squaw Creek (except on a designated entry road into the Sisters Bouldering Area). A seasonal restriction on motorized use would be in place in the main block, consistent with adjacent policy on the CRNG; however, this area remains open year-round for non-motorized use. Non-motorized trails and designated trailheads to serve them are provided. The Sisters Bouldering Area would be managed specifically for climbing use, and would be identifiable as BLM managed land.

The existing road on BLM land that connects Holmes Road to Forest Road 6360 would be retained as a BLM system road. Other roads would be retained or developed in the main block only to the extent necessary to create or access parking areas, trailheads or

developed sites, or to serve existing administrative use. Designated trails would be developed to serve as a trail link between the southwest end of the main block and Forest Road 6360. One or two additional trail loops would be provided in the area, particularly if a separate trailhead is developed off Holmes Road. The road and trail density goal for the main block would be would be limited to a range of approximately 1.5 to 2.5 miles per square mile (including Holmes Road, a paved public road through the area).

Off highway motorized vehicle use would be managed to provide visitor satisfaction, protect natural resources, provide visitor safety, and minimize conflicts among various users and neighbors. Non-motorized recreation opportunities would also be provided to offer visitor satisfaction, protect natural resources, and minimize conflicts among users and neighbors. Designated access points, which include entry points, and parking areas, trailheads, and staging areas would be added to enhance visitor experience, protect resources, and minimize conflicts with neighboring land owners.

Motorized travel in main block would be limited to designated roads. All BLM roads in this area (except access roads to non-motorized trailheads or developed sites) would be closed to motorized use seasonally, from December 1 to March 31. Isolated parcels west of Squaw Creek would be Closed to motorized travel, except for Sisters Bouldering Area, which would be limited to designated roads only, year-round.

Prineville
This alternative would be the same as Alternative 6.

Prineville Reservoir
The northeastern portion of the area (the Sanford Creek drainage) would be managed for relatively low motorized access, with designated roads only being open seasonally. The remainder of the area, including lands on either side of the Bear Creek arm of Prineville Reservoir, would be limited to designated roads only year-round. These BLM lands would have designated, non-motorized trails that link to BOR/State Park managed sites at Prineville Reservoir.

Designated roads and OHV use would be the same as Alternative 2. However, motorized travel would be Limited to designated roads south of Prineville Reservoir (Taylor Butte travel is limited under Common to Alternatives 2 - 7), except:

- Within the Sanford Creek area motorized travel would be Limited seasonally May 1 thru November 30.
- Area north of upper Portion of Prineville Reservoir is designated limited to designated roads and trails and motorized travel would be limited seasonally May 1 through November 30.
- Area between County Boat Ramp and Chimney Rock Trail (i.e. the area north of Prineville Reservoir and immediately east of the Crooked River) would be Closed to motor vehicles.

Smith Rock
The entire block would be closed to motorized vehicles. Additional non-motorized trails may be created both to solve resource issues at climbers' trails and to meet demand for hiking, mountain biking, and equestrian trail opportunities.

The road and trail system goal for the area would be limited to a range of approximately 1.0 to 2.0 miles per square mile.

The development of additional trails to reduce impacts at climbing areas and to provide additional mountain bike, hiking, and equestrian use opportunities would be allowed.

Trail development would be coordinated with SRSP and CRNG. Trails would be designed and located to protect resources and scenic values.

South Millican

South Millican would remain as an OHV use area, but would retain the existing seasonal closure (area closed to motorized use from December 1 through July 31). Motorized use would be Limited to designated roads and trails, and the existing trail system would be retained. No new trail connections would be provided between the motorized trail system in South Millican and trails in the adjacent Deschutes National Forest.

Trail dependent special recreation events (i.e., trail rides, races, etc.) would generally not be allowed in the South Millican area, except for the minimum use necessary to complete loops on the non-motorized trail system in or around Horse Ridge.

Steamboat Rock

The majority of the main block of public land in the Steamboat Rock area would be managed for both motorized and non-motorized use on a shared trail system. While this area would be open to OHV (Class I and III, i.e., motorcycles and quads), it would be closed to full size vehicles in an effort to reduce conflicts between adjacent landowners and public land visitors and to reduce illegal dumping prevalent in the area. The number of access points would be reduced, and new roads would be created to link existing roads back to common access points or trailheads. A separate trail system for non-motorized use would be developed along the Deschutes River. The river parcels adjacent to Crooked River Ranch would continue to be managed to emphasize non-motorized use. Isolated parcels northwest of Redmond are managed exclusively for non-motorized use, with access improvements to allow access to the middle Deschutes River while minimizing conflicts with landowners.

The existing high density (approximately 8 miles of roads per square mile) of roads in the main Steamboat Rock block would be reduced, with many roads being closed and rehabilitated while others would be managed as trails. The existing number of access points would be reduced, leaving only approximately 2 or three access points from Lower Bridge Road, as opposed to the twenty or more currently existing along this four mile stretch of public road. The minimum number of roads necessary for administrative access would be retained, and any access points needed solely for administrative access (e.g., at powerline corridors) may be gated and not available as public access points. The area adjacent to the Deschutes River would be closed to motorized use, and managed for non-motorized use on a designated trail system. The road and trail system goal for the main block would be limited to a range of approximately 2.0 to 3.0 miles per square mile.

Main block managed as Limited to designated roads and trails only, and limited to Class I and III OHVs only (no full size vehicles). The Deschutes River corridor in the main block is designated as Closed to motor vehicles. The boundaries of the closure area are Lower Bridge Road to the north, the main unimproved road that parallels the river to the east, and the BLM boundary with private land to the south and west. With the exception of the BPA powerline parcel, all isolated BLM parcels northwest of Redmond are designated as Closed to motor vehicles (see Common to 2 - 7 direction). The Deschutes and Crooked River corridors adjacent to Crooked River Ranch are limited to designated roads only.

Tumalo

The Tumalo Block would be closed to motorized use year-round, and the recreation management emphasis would be to provide non-motorized opportunities (hiking, mountain biking, and equestrian use) on designated trails year-round. Designated and managed parking areas/trailheads would be provided to serve the trail system. A designated, non-motorized trail system would be developed and signed in both larger parcels north and south of Tumalo Reservoir. In order to control motor vehicle access into these areas, the boundaries may be fenced.

Roads would be retained or developed in the Tumalo block only to the extent necessary to create or access parking areas, trailheads or developed sites, or to serve existing administrative use. Roads not needed for administrative access may be closed and rehabilitated or modified to serve as trails. Designated trails would be developed to serve as links to Deschutes National Forest lands to the west, as well as to provide several smaller loops within BLM lands. The road and trail density goal for the main block would be would be limited to a range of approximately 1.5 to 2.5 miles per square mile (including Sizemore Road, a paved public road through the area).

The Tumalo area would be closed to motorized use.

Transportation and Utilities

Alternative 7 would consolidate transportation and utility systems with consideration for ecological and recreational values, while providing for regional transportation systems and meeting regional objectives. The road network and transportation/utility corridors would be designated as shown on Map 3. In addition, this alternative allocates a transportation/utility corridor adjacent to the Burlington Northern/Santa Fe railroad right-of-way approximately ½ mile wide south of Redmond, extending to Deschutes Junction. Alternative 7 identifies 61 percent of the planning area in a primary wildlife emphasis designation and 43 percent in either a non-motorized emphasis or non-motorized exclusive designation. The recreation designations may or may not be included in the primary wildlife emphasis designation. Refer to the Recreation and Wildlife Emphasis maps for specific locations.

Land Ownership

This alternative has the same priorities for rural and urban lands as Alternative 6. This alternative prioritizes land actions in the urban areas, emphasizing connective corridors and blocking up large public parcels. It directly emphasizes wildlife and indirectly recreation, because most wildlife activities involving land ownership would correspond to activities involving recreation. The alternative does not prioritize recreation before wildlife. Community needs have been identified by each of the communities, and public lands designated to address those needs. An emphasis on management ease or land patterns would be coincidental with wildlife or recreation activities in the same location. Alternative 7 would provide direction to designate the lands in Map 34 as Z-1 (approximately 327,626 acres) in the more urban areas to provide for wildlife and more intensive recreational uses, and retain lands in the more rural areas to provide for wildlife and moderate recreational uses. Blocks of public lands identified as Z-1 include Tumalo, Cline Buttes, Northwest, Steamboat Rock, Bend/Redmond Core, Smith Rocks, Mayfield, Badlands, Horse Ridge, Prineville Reservoir, Southeast, and Highway. In La Pine, Z-1 lands would be north and east of Wickiup Junction. Other, smaller parcels of public land include Grizzly Mountain, Ochoco Reservoir, and Juniper Canyon.

This alternative would also designate the lands in Map 34 as Z-2 (approximately 69,579 acres) as generally to retain. Isolated and fringe public parcels have also be identified as Z-2 to provide connectivity between larger blocks and eliminate trail and road entries onto private lands in the rural areas. Parcels are located between Tumalo and Cline Buttes, Northwest to Cline Buttes, Steamboat to Cline Buttes, Mayfield to Badlands and Reservoir West and Reservoir East to the Maury Mountains. Areas to block up include east and south of Juniper Acres, Horse Ridge, Cline Buttes, Bend/Redmond, Mayfield, and Reservoir West. The isolated parcels generally around Prineville would be used for blocking or connecting and of the locations above. The majority of the public lands in La Pine are Z-2, extending south from Wickiup junction to the boundary of the project area. Parcels were not specifically selected to correspond with private parcels desired for acquisition.

This alternative would designate the lands in Map 34 as Z-3 (approximately 552 acres) as disposal. Parcels suitable for disposal (Z-3) include three isolated parcels between Bend and five parcels designated as Z-3 in La Pine are located west of Wickiup Junction. This alternative would designate the lands in Map 34 (approximately 4816 acres) as Community Expansion (zoned CE). The public lands identified for community expansion near Redmond are located west of the North Unit Canal, south of Redmond Airport, and south of Redmond and east of Highway 97. Public lands identified for a park are between Eagle Crest Phase II and Phase III and south of Highway 126. Public lands identified for a park are east of Prineville, at Barnes Butte. Public lands identified for a park and public facilities are south of Bend Airport.

It would also designate the lands in Map 34 as parcels of interest for acquisition for connectivity to wildlife, access needs, and recreation. Parcels of interest include those between Deschutes National Forest and Clines Buttes, Tumalo and Cline Buttes, Mayfield and Badlands and Reservoir West, and Reservoir East and Maury Mountains.

Public Health and Safety

Alternative 7 firearm discharge management would close the most acreage to all firearm discharge of any alternative (3% of the planning area), including additional closures above Common to Alternatives 2 - 7 management in urban, high-use areas. However, Alternative 7 would close less acreage to firearm discharge unless legally hunting than Alternatives 3 and 5. This alternative would emphasize management in the Badlands area, Steamboat Rock, the Crooked River WSR, the Tumalo block, and parts of Cline Buttes (see Tables 2-73a and 2-73b).

Table 2-72a. Closed to all firearm discharge

Cline Buttes	Canal ACEC
Bend Redmond Block	BLM land southwest of McGrath Road including Historic Roads ACEC, BLM land north of 126, west of N. Unit Canal
Tumalo Block	700-acre parcel south of Tumalo Reservoir Road
Mayfield Pond Block	Airport parcel
North Millican Block	Dry canyon just north of Hwy. 20
Cline Buttes Block	3 canyons west of Barr Road, South of Hwy. 126
Horse Ridge Block	North of Rickard Road, South of Hwy. 20

Table 2-72b. Closed to firearm discharge unless legally hunting

Northwest Block	All BLM parcels not closed CT Alts 2 - 7
Millican Plateau Block	BLM lands contiguous and west of the Lower Crooked WSR, and east of Road 6665, East of County Road 6520 for 2 miles from northernmost point of peninsula
Prineville Reservoir Block	BLM lands contiguous and east of Lower Crooked WSR and contiguous and west of BOR/Prineville Reservoir
Tumalo Block	All land north of Tumalo Reservoir
Cline Buttes Block	Main block – All BLM land south of Hwy. 126, and east of Barr Road
Mayfield Block	Main block – south of Alfalfa Market Road
Badlands Block	Entire Badlands Block except ¼ mile around Badlands Rock from March 1 to August 31
Steamboat Rock Block	All BLM land south of Lower Bridge Road outside of the WSR corridor
Horse Ridge Block	BLM land between new and old Highway 20

Alternatives Considered but not Analyzed in Detail

Land Uses and Recreation

The range of alternatives examines seven different combinations of allowable uses on public lands such as livestock grazing, mineral sales, military use, and off highway vehicle use in various levels across the planning area. Alternatives that would have completely eliminated these uses from the entire planning area for the life of the plan were eliminated from detailed study. The underlying Purpose and Need of the Resource Management Plan and the efforts of the collaborative process established the scope of a reasonable range of alternatives. It is based on finding alternative ways to meet multiple interests and demands in some combination across the planning area in all alternatives, rather than to focus on ways of addressing the issues that would not meet some interests at all in specific alternatives.

Rockhounding

This plan identified the need for daily and annual limits on recreational rock collection due to excessive personal and illegal commercial use. The following paragraphs list the approaches to limited rock collection that were eliminated from detailed analysis. Limiting the combined total of rocks, semi-precious gemstones, mineral specimens and common invertebrate fossils collected from public lands to the same limit as petrified wood (25 pounds per person per day plus one piece and not to exceed 250 pounds per year) was considered. This was eliminated from detailed consideration because a limit based on a combined total of many rock types is more restrictive than the same limit based on one rock type. A more restrictive limit is not needed because many rocks, semi-precious gemstones, and mineral specimens in the planning area are more abundant or under less demand than petrified wood.

Establishing daily collection limits based on individual rock types was considered but eliminated from detailed consideration on the basis of impracticability. It is impractical for rockhounders to have knowledge of every rock type they might collect. Moreover, rock identification is complicated by various rock subtypes with many different common names.

Continuing to follow the BLM Oregon/Washington State Office guidelines of 250 pounds per person per day was eliminated from consideration because there is no annual limit and up to 250 pounds of rock materials could be collected each day. This option would not significantly discourage illegal commercial activity or excessive personal use.

Public Health and Safety

Implement a firearm discharge closure buffer across the entire planning area
One tactic to manage firearm discharge that was considered but eliminated from detailed analysis incorporated the implementation of a ¼ mile wide no-shooting buffer around all large blocks of BLM land within the planning boundary. This approach would have required BLM to immediately implement and enforce a no-shooting closure hundreds of miles in length. Instead, the guidelines in PHS Objective 4 – Reducing Risk in Residential Areas, are being utilized. Objective 4 guidelines provide a mechanism for adjacent landowners (including private landowners and public entities) to request no shooting buffers on adjacent BLM lands. This approach was viewed as preferable because: 1) closures would be citizen-based, emphasizing public awareness, input, and debate, 2) closures would be geographically explicit, protecting as much firearm discharge opportunity as possible, 3) adjacent governments would be involved, improving

communication and cooperation between agencies, and 4) the initial amount of area closed by BLM would be greatly reduced, thereby improving implementation.

BLM-managed shooting ranges

One of the firearm discharge options discussed during Public Health and Safety Issue Team meetings included the idea of BLM-managed shooting ranges. While numerous ideas were explored, the general concept focused on turning existing gravel or cinder pits into designated shooting areas. These areas would be dispersed throughout the planning area. Local target shooting enthusiasts could then utilize a known area with an established backstop. In turn, other nearby recreationists would know exactly where target shooting would take place, allowing them to select an adjacent area for their visit. In moving to another area these non-shooters could reduce their chance of being struck by a bullet, reduce their fear associated with being struck by a bullet, and reduce conflicts associated with the sounds of concentrated target practice.

A BLM-managed shooting range option was considered but eliminated from detailed analysis for the following reasons:

1) As envisioned by most Public Health and Safety Issue Team members, BLM-managed shooting ranges would not require any active agency presence, including staff to supervise and educate users. From a liability standpoint, this approach is fundamentally unacceptable. Discharging a firearm is an inherently dangerous activity. At commercial shooting ranges users must sign waivers before shooting, and are given explicit instructions on what, how, and where to shoot. Commercial shooting ranges users are monitored by range employees, and users conducting themselves in an unruly manner are removed. However, the proposed BLM shooting ranges would have none of these safeguards. Additionally, some users can be expected to visit under the influence of alcohol and/or drugs, increasing the potential danger of an already unregulated situation.

2) The next logical approach would require BLM to staff its own managed shooting ranges. However, the BLM Prineville District does not presently, nor in the foreseeable future (e.g. the life of this Plan), have the resources to staff a developed shooting range. Even a more limited responsibility of simply open and closing gates (to restrict use to daylight hours) is presently beyond the District"s capacity.

3) Even if BLM was willing and capable of staffing its own managed shooting ranges, a certain section of the shooting population would be unwilling to utilize this kind of facility. These citizens explicitly only enjoy an unmanaged environment, one in which they can shoot what, how and where they want. This opinion was expresses by some members of the Public Health and Safety Issue Team. These individuals commented that other shooters might be interested in using a managed shooting range, but they personally would not. User fees usually associated with managed shooting ranges were found to be an additional deterrent.

4) While the BLM cannot manage its own shooting ranges, the opportunity for other entities to construct and manage their own ranges, on BLM land, through an R+PP lease, is possible and an explicit interest of management. Presently the COSSA facility on Highway 20 is partially serving the public shooting need, and the District is open to leasing additional entities BLM land for the purpose of a managed shooting range.

5) Over time, areas of concentrated firearm discharge will develop high levels of metallic lead. Presently, controversy remains over the possible adverse environmental affects from the deposition of metallic lead on land or behind a backstop area. Historically the Environmental Protection Agency (EPA) has mandated Resource Conservation and Recovery Act (RCRA) action requiring the cleanup of some shooting ranges related to observed levels of lead. At a minimum the National Rifle Association (NRA) maintains the position that metallic lead constitutes a scrap metal, and should

be reclaimed (collected) on a regular basis. While national BLM standards have not been adopted, at a minimum, metallic lead should be reclaimed, and more extensive cleanup may be mandated in the future. Presently Prineville BLM does not have the resources to conduct cleanups, nor are the existing mining pits suitable for reasonable lead recovery. The present and potential future difficulties associated with lead reclamation provide another reason why Prineville BLM managed shooting ranges were considered but eliminated from detailed analysis.

Firearm closures restricting type of weapon

Another firearm discharge closure method considered but eliminated from detailed analysis would have restricted the type of weapon that could be utilized for hunting in a particular area. However, this is not the preferred approach in Central Oregon for three reasons. First, the firearm predominantly used for hunting within the planning area is a rifle, and is not easily substituted with another type of weapon (e.g. hunting deer with a shotgun). BLM is sensitive to traditional uses of public land and seeks to allow those uses to continue without further regulation whenever possible. Second, from a recreation opportunity perspective, closing some areas to all firearm discharge is preferable to closing areas to a particular type of weapon. This approach provides visitors who are highly sensitive to firearm discharge a place to recreate. Finally, restricting by the type of weapon makes education difficult for both hunters and non-hunters alike. Proponents argue the firearm-specific approach has been used extensively on the East Coast, especially in New England. However there is relatively little public land on the East Coast. Most hunting is conducted on private land, and much of the public land is closed to all firearm discharge year round. Areas that do allow hunting generally have easily identifiable boundaries, with established access points, and visitors accessing the area can be educated relatively easily about firearm regulations.

In contrast, the Central Oregon region is dominated by public land (both BLM and USFS), and most of it is presently open to all firearm discharge. Wide open spaces and relatively sparse vegetation makes the rifle the traditional hunting weapon of choice. Additionally, Central Oregon's human population is expected to double over the life of this Plan, and many of the new immigrants are, and will continue to, come from urban areas. These visitors are unaccustomed to firearm discharge. From a recreation opportunity perspective, these visitors are expected to prefer areas without any firearm discharge rather than areas restricted by type of firearm. Finally, weapon-specific restrictions increase the overall complexity of restrictions on BLM land, requiring an increased knowledge base of all users. The Prineville District prefers to keep the regulations as simple as possible. In the future, as the number of subdivisions outside city boundaries increase, and as additional facilities are developed on BLM land, and as the public becomes better educated about existing regulations, a weapons-specific approach may become more suitable for Central Oregon. At this time it is preferable to limit an area to all firearm discharge rather than type of firearm.

Table 2-1. Comparison of Alternatives

Issue Category	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Ecosystem Health/Diversity							
Vegetation							
Vegetation Management Emphasis		Current Distribution	Historic Range of Variability	Same as 2	Same as 2	Same as 3	Same as 3
Changes in Vegetation Priority Treatment Areas (Acres)[1]:				Same as 2	Same as 2	Same as 3	Same as. 3
WUI		*83,727	*83,727				
Verified High Priority Restoration (Lower Crooked River Subbasin)		0	45,098				
Verified High Priority Restoration (Upper Crooked River Subbasin)		*40,746	*40,746				
Aquatic Stronghold Restoration		*29,722	*29,722				
Canyon Treatment		5,883	0				
Priority Old-Growth Juniper Rest.		*12,317	*56,611				
Peck's Milkvetch Treatment Area		323	0				
Ponderosa Pine		*5,766	*5,766				
Priority Sage Grouse Restoration		*94,412	*127,276				
Mule Deer Winter Range Restoration.		15,684	0				
Total Veg. Treatment(15 years)[2]	**71,000**	***168,310**	***230,250**				
Fire/Fuels Management							
Estimated annual prescribed fire treatments Year				Same as 2	Same as 2	Same as 3	Same as 3
1 – 5 Year 1-5	2,580	1,265	3,838				
Year 6 – 15	2,580	5,253	9,210				
Estimated annual mechanical treatment (includes WUI)				Same as 2	Same as 2	Same as 3	Same as 3
Year 1 – 5 Year 1-5	2,150	11,385	11,512				
Year 6 - 15	2,150	5,253	6,140				
Wildlife							
Crucial Winter Range (deer and pronghorn)	47,343	None designated	None designated	None designated	None designated	None designated	
Source habitats	None identified	Current Distribution	Historic Range of Variability	Current Distribution	Current Distribution	Historic Range of Variability	Historic Range of Variability
Wildlife Emphasis -- Acres / %[3]							
Primary[4]	160,000 / 40%	99,000 / 25%	256,000 / 63%	159,000 / 39%	117,000 / 29%	218,000 / 54%	244,000 / 61%
Secondary	55,600 / 14%	22,000 / 5%	57,000 / 14%	31,000 / 8%	134,000 / 33%	29,000 / 7%	33,000 / 8%
Minor	187,000 / 46%	281,000 / 70%	91,000 / 23%	214,000 / 53%	153,000 / 38%	156,000 / 39%	126,000 / 31%

Special Management Areas							
ACEC Designated Acres							
Wagon Roads	*75	*875	*875	*875	*875	*875	*875
Badlands	*16,684	*16,684	*16,684	*16,684	*16,684	*16,684	*16,684
Horse Ridge RNA	*609	*609	*609	*609	*609	*609	*609
Powell Butte RNA	*510	*510	*510	*510	*510	*510	*510
Peck's Milkvetch	*4,073	*4,073	*4,073	*4,073	*11,144	*11,144	*10,325
Alfalfa Market Road	0	0	4,200	4,200	0	0	0
Juniper Woodlands	0	0	31,011	6,756	0	0	0
Sage Grouse	0	0	0	16,257	0	0	0
Smith Rock	0	0	2,119	0	0	2,119	0
Tumalo Canal	0	1,050	0	0	1,050	1,050	1,050
Lower Crooked River	2,592	0	0	0	0	0	0
Total ACEC Acres	**24,543**	**23,801**	**60,081**	**49,964**	**30,872**	**32,991**	**30,053**
Land Uses							
Livestock Grazing							
Acres available for livestock grazing[5]	388,823	388,271	388,271	348,394	228,685	347,522	279,321
AUMs / Number of Allotments[6]							
Available (Open)	25,816 / 124	25,747 / 124	23,747 / 124	23,471 / 86	13,286 / 61	24,308 / 115	21,310 / 86
Available as RFA[7]	0	0	0	0	0	0	1,967[9] / 10
RFA or not available (Closed)[8]	0	0	0	0	0	0	1,779[10] / 22
Not available (Closed)	0	69 / 0	69 / 0	2,345 / 38	12,530 / 63	1,508 / 9	760[11] / 6
Minerals							
Land available for mineral sales Acres / %	403,910 / 100%	342,108 / 85%	339,989 / 84%	328,681 / 81%	304,708 / 75.3%	339,989 / 84%	342,108 / 85%
Land available for Locatable Mineral Entry	*403,910 / 100%	*403,910 / 100%	*403,910 / 100%	*403,910 / 100%	*403,910 / 100%	*403,910 / 100%	*403,910 / 100%
Land available for Mineral Leasing	*374,365 / 93%	*374,365 / 93%	*374,365 / 93%	*374,365 / 93%	*374,365 / 93%	*374,365 / 93%	*374,365 / 93%
Special Forest/Range Products							
Estimated volume (ccf / mbf)	500 ccf / 250 mbf	1200 ccf / 600 mbf	1500 ccf / 750 mbf	Same as 2	Same as 2	Same as 3	Same as 3
Military							
Land available for military use Acres / %	29,744 / 7%	36,397 / 9%	21,207 / 5%	26,194 / 6%	29,760 / 7%	55,665 / 14%	50,600 / 13%
Recreation							
Recreation Emphasis -- Acres / %							
Mixed Use/shared facilities	31,600 / 78%	312,000 / 77%	157,000 / 39%	235,000 / 58%	211,000 / 52%	166,000 / 41%	153,000 / 38%
Mixed Use/separate facilities	0	0	29,000 / 7%	0	41,000 / 10%	31,000 / 8%	27,000 / 7%
Non-motorized Emphasis	42 />1%	58,500 / 14%	65,500 / 16%	122,000 / 32%	86,000 / 21%	69,000 / 17%	87,000 / 21%
Non-motorized Exclusive	11,000 / 3%	26,000 / 6%	82,000 / 20%	28,000 / 7%	55,000 / 13%	34,000 / 21%	88,000 / 22%
Roads Only, low Rec emphasis	76,000 / 19%	5,270 / 2%	68,000 / 17%	16,000 / 4%	10,000 / 2%	51,000 / 13%	47,000 / 12%
Non-Rec Emphasis	0	1,500 / 1%	1,400 />1%	1,500 />1%	400 />1%	1500 />1%	1500 />1%
Travel Management Designation							
Designated Open (Acres / %)	153,600 / 38%	0	0	0	0	0	0
Motorized use limited to existing roads and trails	95,000 / 23%	0	0	0	0	0	0
Designated Closed[12]	6,550 / 2%	20,370 / 5%	75,960 / 19%	23,473 / 6%	48,016 / 12%	78,429 / 20%	91,000 / 23%

Motorized use limited to designated roads or designated roads and trails	80,500 / 20%	371,000 / 92%	213,234 / 54%	309,703 / 78%	247,185 / 61%	205,454 / 52%	240,000 / 60%
Motorized use limited to designated roads or designated roads and trails – seasonally	47,000 / 12% (15,400 / 4% closed depending on snow depth)	11,500 / 3%	89,133 / 22% (19,846 /5% closed depending on snow depth)	65,094 / 16%	107,801 / 27%	113,928 / 28%	67,000 / 17%
Motorized use limited to existing roads and trails seasonally	4,600 / 1%	0	0	0	0	0	0
Land Ownership							
Z-1 (Retain)	206,201 / 51%	359,690 / 89%	357,598 / 89%	327,335 / 81%	322,693 / 80%	344,406 / 86%	310,272 / 77%
Z-2 (Retain, may exchange)	175,523 / 44%	23,082 / 6%	34,829 / 8%	57,488 / 14%[14]	66,713 / 17%	39,693/ 10%[17]	83,812 / 21%
Z-3 (Dispose)	15,422 / 4%	12,639 / 3%	7,456 / 2%	9,669 / 3%	7,821 / 2%	13,789 / 3%	5,107 / 1%
Community Expansion	5,617 / 1%	7,592 / 2%	3,121 / 1%[13]	8,512 / 2%[15]	5,776 / 1%[16]	5,115 / 1%[18]	4,882 / 1%[19]
Transportation and Utilities							
Road designation by miles							
Arterial	224	224	212	224	225	224	224
Collector	302	302	104	104	104	104	104
Local	2,562	2,562	2,808	2,808	2,808	2,808	2,808
Public Health and Safety							
Closed to all firearms discharge[20]	[21]710 />1%	*4,779 / >1%	*8,418 / 2%	*8,418/ 2%	*8,418 / 2%	*6,411/ 2%	*10,500 / 3%
Closed to all firearms discharge unless legally hunting	3,646 / 1%	*19,687 / 5%	*120,333 / 30%	*22,236 / 6%	*109,010 / 27%	*57,674/ 14%	*82,631 / 20%

*Acres include acreage Common to All Alternatives and Common to Alternatives 2-7.

[1] For this table, all acreages are approximate.
[2] Due to overlap of priority treatment areas, these categories will not add up to the Total Vegetation Treatment acres.
[3] Percentages in this table indicate percentage of the approximately 404,000 acres of the Planning Area that are under BLM jurisdiction, not of the total Planning Area (see Ch. 1).
[4] Alternative 1 does not use the concepts of "primary, secondary, or minor" for wildlife habitat emphasis. An area of B/LP RMP acres with management direction similar to that under the new "primary" designation was used to compare the alternatives.
[5] The available acres are not 100% of the acres in the planning area; several thousand acres remain unavailable to grazing in all alternatives.
[6] Allotments were counted as Open if any portion of the allotment remains Open in the alternative. Number of allotments counts La Pine unallotted as one allotment.
[7] RFA = reserve forage allotment (see text for description)
[8] The "Close or RFA" column is a management discretion category.
[9] This figure assume the permittees voluntarily relinquish their permits. If they don't, the figures would drop to 0 and "open" would increase correspondingly.
[10] *ibid*
[11] *ibid*
[12] Areas designated closed are closed to vehicles off of roads. In some closed areas, motorized use on roads is allowed.
[13] Designation applies only to parks, green belts, and open spaces.
[14] Exchanges must be for equitable habitat and recreational values; exchanges between large blocks near Bend/Redmond are for the purpose of blocking up or creating corridors between large blocks.
[15] Proposed projects would include interconnecting open spaces.
[16] *Ibid.*
[17]Exchanges must be for equitable habitat and recreational values; exchanges between large blocks near Bend/Redmond are for the purpose of blocking up or creating corridors between large blocks.
[18] Designation applies only to parks, green belts, open spaces, open recreation spaces, and open community infrastructure needs.
[19] Designation applies only to parks, green belts, open spaces, open recreation spaces, and open community infrastructure needs for the Sawtooth area on Hwy. 97.
[20]290 of these acres include seasonal raptor closures.
[21]Firearms closure figures for all alternatives are inclusive of 590 common acres closed to all firearms discharge, and 527 common acres closed to all firearms discharge unless legally hunting.

Chapter 3
Affected Environment

Introduction

Central Oregon is a land of rapidly growing communities amid vast tracts of BLM administered lands and privately owned agricultural and range lands. Except for the population centers, the land is sparsely settled and largely undeveloped. Because the Cascade and Ochoco Mountains are cold and snowy and the high desert between the communities and to the east and southeast of the developed areas are arid and rocky, development of the region has been limited. The recent rapid growth of the developed communities is partly a function of the attractive recreational opportunities available on Forest Service and BLM administered lands, coupled with the improvements in transportation and communication that have reduced the isolation of Central Oregon from the rest of the world.

This chapter describes the current situation on the planning area, starting with the history and social setting, and the physical and geographical setting. The remainder of the description of the affected environment focuses on the elements of the environment that are the foundation of the issues addressed by the alternatives and analyzed in the environmental consequences. These elements are discussed in the same sequence as established in the issue statements in Chapter 1 and carried through each of Chapters 2, 3, and 4.

Physical Setting

Climate

The climate within the planning area is controlled primarily by air masses that move eastward across western Oregon, and into Central Oregon. What happens to these air masses in Central Oregon is largely the function of two geographical variables. The first is elevation. As elevation decreases from the southern part of the planning area near La Pine to the northern part of the area near Madras, average temperature increases while precipitation decreases. The second is the rain shadow effect of the Cascade Range, which diminishes precipitation rates moving west to east, with the western part of the planning area averaging 15 inches per year. The eastern part of the planning area averages 10 inches per year. The La Pine area averages 15-20 inches per year (Taylor, 1993). Most of the precipitation occurs as snow during winter months, and thunderstorms during summer months. The summer thunderstorms are often high intensity and relatively short in duration. The amount and duration of snowfall in winter is variable, but the southern part of the area receives the highest amounts for the longest duration (USDA, NRCS, 1998). Average high air temperatures generally range in the low 40s in the winter to mid-80s in the summer, with extremes around 107°F. Average low temperatures range in the low 20s in the winter to high 40s in the summer, with the coldest temperatures plummeting to -34°F in the winter.

Air Quality

Most of the planning area has relatively high air quality. A steady trend toward improved visibility has been observed in the Bend and Redmond areas in the past 10 years, largely attributed to the phasing-out of older wood stoves and the use of cleaner methods for heating homes.

Some wilderness areas have been designated Class I Areas for air quality management. No class I areas lie within the planning area, although the Mt. Jefferson, Mt. Washington, and the Three Sisters Wildernesses all lie 15 to 30 miles to the west, and the Strawberry Mountain Wilderness is 70 miles to the east.

Particulate emissions are regulated for some counties in Oregon. No regulation exists for Deschutes, Jefferson, or Crook Counties. Klamath and Lake Counties are partial non-attainment areas for PM-10, which is airborne particulate material in smoke that is less than 10 microns in diameter. The portions of Klamath and Lake Counties with this designation are the populated areas around Klamath Falls and Lakeview, some 80 miles south of the planning area.

Physiography and Drainage

The planning area includes parts of the two major ecologically based land provinces—the Mazama, and the John Day. The physical characteristics of the different provinces of Oregon are based on geography, geology, and soil (Anderson *et al.*, 1998). The planning area resides in the Deschutes Basin, primarily within the Lower Crooked, Upper Deschutes, and Little Deschutes, Sub-basins (See Map S-14: Sub-basins, Watersheds, and Sub-Watersheds; and the Aquatic/Riparian/Water section for more discussion on hydrologic units). Numerous miles of perennial, intermittent, and ephemeral streams dissect the area.

The highest point in the planning area is West Butte with a summit elevation of 5,840 feet. The lowest points are in the Deschutes and Crooked River canyons, which drop to just under 2000 feet at the northern boundary of the planning area.

The Mazama province is represented in the western three-quarters of the planning area. It is covered by a continuous mantle of wind blown deposits of pumice and other volcanic materials spewed over the countryside when Mt. Mazama erupted about 6,500 years ago. Other volcanic activity and eruptions, as well as glacial actions, have created areas consisting of basaltic, andesitic, rhyolitic, and tuffaceous deposits and cinders and glacial till.

The John Day province is represented in the northeastern quarter of the planning area. Long, generally north-to-south, mountain ranges and valleys with ancient lake terraces and fans characterize the area.

The geology of the planning area is characterized by relatively young extrusive volcanic materials and volcanic derived sedimentary materials. For the most part the rocks are flat lying, being interrupted by a few rounded piles of volcanic material, small displacement faulting and an occasional topographic extreme, including Smith Rocks and the canyon of the Crooked River. Relief is moderate throughout the planning area. The topography of the Deschutes and Crooked Rivers is the product of numerous volcanic eruptions within and around the basin. These have contributed to a diverse section of lava flows, pumice air-fall deposits, and ignimbrites. Erosion of these volcanic materials have supplied large volumes of fragmental material to form the volcaniclastic sediments found in the basin. Interesting geologic features found in the area include cinder cones, lava flows, pressure ridges and lava tubes (caves).

The La Pine sub-basin in the southwest portion of the planning area lies between the High Cascade Mountains and Newberry Volcano, and has served as a catchment for the materials eroded off the sides of the volcanic piles. The basin has filled with stream and lake deposits composed of volcanic derived silts, sands, gravels with minor amounts of diatomite.

Most of the planning area is drained by the Deschutes River and its tributaries, which include the Little Deschutes River, Tumalo Creek, Dry River, Squaw Creek, Metolius River, Crooked River, and Willow Creek. Water is a limited resource in the agricultural areas of the survey area because of the limited precipitation, high infiltration rate, and moderate or high permeability of the soils.

Three important fault zones are present in the planning area, the Brothers, Sisters and Walker Rim fault zones. The Brothers fault zone consists of numerous NW-SE trending right-lateral faults with displacements generally less than 50 feet (Orr and others, 1992). This fault zone extends 130 miles NW from Steens Mountain and merges with the Sisters fault zone near Bend. The Sisters fault zone trends NE from just south of Bend and extends 40 miles to Black Butte (Sherrod and others, 1997b). Approximately 50 faults ranging from 0.3 to 30 miles in length have been mapped in the Sisters fault zone. The Walker Rim fault zone extends southwest from the Newberry volcanic complex through the La Pine portion of the planning area toward Crater Lake.

Geological History

The geologic history of the planning area consists primarily of varied volcanic events and processes beginning 44 million years ago and continuing to the present. These processes resulted in a complex assemblage of volcanic rocks including flows of basalt, andesite, rhyolite, and welded tuff and various tephra deposits of ash, pumice, cinders, and volcanic bombs. Prominent geomorphic features in the planning area include lava tubes, pressure ridges, columnar basalt, cinder cones, shield volcanoes, and deep canyons. Rivers in the region were often overloaded with volcanic materials and the subsequent erosion, transport, and re-deposition of these materials produced various volcaniclastic sedimentary rocks.

The oldest rocks in the planning area comprise the Clarno Formation. Emplacement of these rocks began approximately 44 million years ago during the Eocene with the opening of a chain of volcanic vents in eastern Oregon (Orr and others, 1992). The Cascade Mountains were not present at this time and the Pacific Ocean shoreline was east of the modern day location of the Cascades. With no topographical barrier to moisture-laden air from the ocean, a wet tropical climate prevailed and supported lush woodlands interspersed with open grasslands. The Clarno volcanoes erupted large quantities of ash, rhyolite, and andesite. Thick, loose ash deposits on steep volcano slopes frequently mixed with water to form large mudflows known as “lahars” due to the wet climate. These viscous flows moved like molasses over the landscape, entombed both plants and animals, and preserved them as fossils. Plant fossils found in these deposits include petrified wood and leaves, nuts, fruits, and seeds of tropical hardwoods (Retallack and others, 1996). Fossilized remains of prehistoric rhinoceroses and horses are also found. The Clarno Formation crops out along the northeastern and eastern boundaries of the planning area.

In the early Oligocene (about 36 million years ago), the climate shifted from tropical to temperate, Clarno volcanism ceased and a short period of erosion ensued (Orr and others, 1992). Then, a new episode of volcanic activity commenced, producing the rocks of the John Day formation. The volcanoes of the John Day produced explosive ash eruptions and flows that blanketed much of the region. Dense clouds of hot ash swept across the landscape and fused into tuffs under heat and pressure when deposited. In addition to ash deposits, basalt, andesite and rhyolite lavas issued from the volcanoes. Rapidly deposited ash and mud from volcanic activity provided ideal conditions for fossilization of the semi-tropical plants and animals living in the region at the time. Preserved foliage from dawn redwood (metasequoia) and alder are common in these deposits (Retallack and others, 1996). Animal fossils include various prehistoric cats, dogs, horses, camels, rodents, and rhinoceroses. Rocks of the John Day Formation crop out in the northern and eastern parts of the planning area including Smith Rock and Powell Buttes (Brown and others, 1980; Smith and others, 1963).

During the Miocene and Pliocene, successive volcanic flows built Cascade Mountains high enough to become a topographic barrier to moist air from the Pacific, transforming the eastern Oregon climate into the dry climate of the present (Orr and others, 1992). Volcanic activity during the Early Miocene (16-12.5 million years ago) in the Western

Cascades delivered large quantities of volcanic material into the Deschutes basin and overloaded rivers with sediments. The Simtustus Formation was deposited in the northwest part of the planning as rivers reworked these sediments into volcaniclastic sandstone and mudstone deposits up to a total thickness of 250 feet. During this time, about 15.7 million years ago, the Prineville basalt erupted from vents believed to be near Bowman Dam (Hooper and others, 1993). This succession of flood basalts is present throughout the northeastern part of the planning area and beyond with some flows extending to Portland, Oregon. The Prineville basalt sequence crops out in the Crooked River canyon with relatively numerous and thick flows near Bowman Dam. The Deschutes Formation was created when another phase of volcanism began 8 million years ago. Early High Cascade volcanoes erupted andesite, basalt, and hot clouds of tuff-forming ash into the Deschutes basin over a period of 4 million years. The Deschutes and other rivers reworked some of these volcanic materials into coarse conglomerates that are lithologically distinct from the fine-grained sedimentary rocks of the Simtustus Formation (Orr and others, 1992). The Deschutes formation has a thickness of 2000 feet on the western margin of the basin and thins to 50 feet at the eastern margin near the Ochoco Mountains.

Throughout the middle to late Pliocene and into the Pliestocene (beginning 4.0 million years ago), the Deschutes Basin was subjected to more waves of volcanism (Orr and others, 1992). Numerous cinder cones appeared within the basin and the area was flooded by large basalt flows from local vents. The most extensive basalt flows during this time originated from the Newberry shield volcano south of Bend beginning about 600,000 years ago (Sherrod and others, 1997a). These flows blanket much of the western half of the planning area between Bend and Powell Buttes and extend north to Smith Rock and Lake Billy Chinook.

Three important fault zones are present in the planning area, the Brothers, Sisters and Walker Rim fault zones. The Brothers fault zone consists of numerous NW-SE trending right-lateral faults with displacements generally less than 50 feet (Orr and others, 1992). This fault zone extends 130 miles northwest from the Steens Mountain and merges with the Sisters fault zone near Bend. The Sisters fault zone trends NE from just south of Bend and extends 40 miles to Black Butte (Sherrod and others, 1997b). Approximately 50 faults ranging from 0.3 to 30 miles in length have been mapped in the Sisters fault zone. The Walker Rim fault zone extends southwest from the Newberry volcanic complex through the La Pine portion of the planning area toward Crater Lake.

Water

Groundwater flow that originates in the Cascade Range is the major source of streamflow for the Lower Deschutes and Lower Crooked Rivers, and Lower Squaw Creek (Gannett, *et al.*, 2001). Substantial ground-water discharge occurs along the lower 2 miles of Squaw Creek, the Deschutes River between Lower Bridge and Pelton Dam, the lower Crooked River, and in Lake Billy Chinook. The discharge of groundwater is controlled by geology, where the low permeability of the John Day Formation forces groundwater from the overlying Deschutes Formation to be discharged into the rivers. Discharge of groundwater is demonstrated by the numerous springs that emanate from the canyon walls of the lower Crooked River and lower Deschutes River gorges. The flows for Upper Squaw Creek, Little Deschutes River, Tumalo Creek and Crescent Creek originate as spring flows in the Cascades. Snowmelt from the Ochoco and Maury Mountains, as well as springs from the South Fork Crooked River, provides flow to the Upper and Middle Crooked River. Natural flows of the Upper Deschutes and Crooked Rivers have been modified by 5 major reservoirs and diversions of water from the rivers for irrigation.

Social Setting

First Nations of the Region

During the first half of the 19th century, when Euroamericans began exploring Central Oregon in pursuit of fur bearing animals and political objectives (Robbins 1997:40; Clark 1981:16- 17; Oetting 1997:8), they occasionally encountered small groups of Indian people involved in seasonal activities throughout the BLM administered lands now included in the planning area. According to observations by those outside travelers, the native people they contacted spoke numerous languages or dialects and were members of various tribal groups. A partial listing of those tribal groups included the following: Snake; Hunupui Eaters; Shoshone, Paiute; Northern Paiute; Juniper-Deer-Eaters; Warm Springs; Tygh; Molalas; Shahala; Wasco; Upper Chinook; Tenino; Celilo; Wyam; Wanapum; Sahaptin; and Klamath (LeBow 1990:19). In an attempt to alleviate some of this historical confusion, ethnographers and linguists doing studies in the late 19th and early 20th centuries, as well as reorganization during the establishment of reservations, concluded that native people living in the Central Oregon region at the time of white contact consisted of three primary tribal groups: the Wasco and Warm Springs; Northern Paiute; and the Klamath.

During historic times, the Wasco and Warm Springs people occupied portions of the lower Columbia River and segments of the Deschutes and John Day Rivers (Confederated Tribes of Warm Springs 1992:2). The Northern Paiute were based in the Harney Valley but used resources along the upper Deschutes and John Day Rivers as well as throughout the High Desert (Burns Paiute Tribe 1992, personal communication). In contrast to that, the Klamath lived beside the lakes and marshes of the Klamath basin in southCentral Oregon, but used resources on a seasonal basis along the upper Deschutes River and in the adjacent High Desert area (Zucker *et al.*, 1983:11). Conflicts between those groups over lands and resources did occur periodically (Oetting 1997:8) leaving it largely unknown which group may have held the territory on a consistent basis. Yet despite those ambiguities, at least three assumptions about pre-contact land tenure can be made from both the archaeological and ethnographic evidence: changes in environmental conditions warranted modifying land use strategies; one group simply out-competed another for resources; or clashes between groups established new tribal territorial boundaries. What the archaeological record does confirm is that, although Indian people established many temporary camps throughout the area during the past 10,000 years (Pettigrew *et al.*, 1998:3.3), there were few if any permanent settlements in the Upper Deschutes Planning Area (Oetting 1997: 5-10). Whether early prehistoric people were culturally affiliated with contemporary Indians living in the region today is not known.

Indigenous Traditional Lifeways and the Cultural Landscape

Precontact Indians living in Central Oregon were members of hunting and gathering societies who survived by virtue of a detailed understanding about their surroundings (Hunn 1990:91). Like all groups of hunters and gatherers, through time and across space, they followed broad seasonal rounds across the landscape. With a knowledge about resources that comes only from living close to the land, those annual rounds set a schedule determined by the season and dictated by soils, water, and elevation, to put people in a particular place, at a particular time, when particular resources were available for harvesting (Aikens and Couture 1991:21). A typical seasonal round for some, but not all, groups of Indian people living in prehistoric Central Oregon might be as follows: (April) low elevations-first green shoots appear; (April-May) tuberous and globulous roots from semiarid, rocky soils at moderate elevations; (April-May) river stations for salmon; (late June) upper elevation meadows for bulbous roots; (late June-early July) rivers for blueback salmon and summer steelhead and possibly to gather various early fruits such as serviceberries, gooseberries, currants, and chokecherries; (late August-

September) mountain locations for huckleberries, deer, elk; (September-October) river stations for fall chinook and mountain locations for deer and elk; (November-March) occupation of winter villages (Hunn 1990:119-134). While in winter villages, people often took the opportunity to take waterfowl and procure non-migratory species of fish from local rivers, streams, and lakes and to hunt for various large and small game in the immediate vicinity. Additionally, at some winter village locations in Central Oregon, people would participate in communal rabbit or pronghorn drives on the high desert (Aikens and Couture 1993:16).

This discussion constitutes only a small percentage of resources used by Central Oregon native people during their seasonal round. Ethnographic and anthropological studies conducted over the past one hundred years inform us that dozens of different plant and animal resources, from scores of different locations, were used by precontact Indian people living in Central Oregon (Coville 1897; Spier 1930; Couture *et al.*, 1986; Ellis *et al.*, 1998; Hunn *et al.*, 1998). The knowledge of those resources not only provided for the procurement of many different kinds of foods and medicines but also the raw materials to produce tools, utensils and weapons, shelter, clothing, and items of personal adornment, power, wealth and prestige. Taken from that perspective, it becomes obvious that, "the totality of the regional landscape has importance" to local populations of Indian people (Hanes 1995:30).

Aboriginal patterns tethered to annual rounds have been greatly disrupted since white settlement and development in Central Oregon. With the arrival of Euroamericans, property ownership changed, private property was fenced, soils plowed under or grazed over, irrigation canals, roads and railroads constructed, forests cut, wildland fires suppressed, and rivers dammed and reservoirs impounded. Those activities have had a tremendous affect on the plants, animals, fish, and sacred places upon which native people depended. Despite those changes to the land and displacement of resources, many contemporary Indians continue to practice and follow certain aspects of the traditional way of life. Throughout Central Oregon and beyond, they gather roots, berries, various seeds, and medicinal plants, fish, hunt game, and collect numerous items for ceremonial and spiritual purposes. Although changes to the land have, in some cases, forced contemporary Native people to seek resources significant to their cultural identity at new locations, still, other locations have been visited continuously for hundreds and even thousands of years. The rights of Federally recognized Indian Tribes to maintain their cultural identity through such traditional activities on BLM-administered lands has been guaranteed to them as a result of various treaties, statutes, congressional acts, court cases, and executive orders.

Euroamerican Settlement and Development and Historic Resources

The first Euroamerican encounters with Central Oregon came by way of agents of empire and the federal government. Meriwether Lewis and William Clark skirted the northern edge, but never penetrated the hinterlands of Central Oregon during 1805 on their trip down the Columbia River to the Pacific Ocean.

During the next half century, Central Oregon was entered by fur trappers and various explorers in the employ of the Hudson's Bay Company and the federal government. Peter Skene Ogden and his fur trapping brigade penetrated the upper Deschutes and Crooked Rivers during their Snake Country travels to Harney Basin in 1825-1827 (Vaughan 1981:2; Robbins 1997:223). Ogden's excursions into Central Oregon were followed in the 1840s and 1850s by the explorations of John C. Fremont, Robert Williamson and Henry Abbot. Members of the Army Corps of Topographical Engineers, their respective missions resulted in the mapping and documentation of unknown portions of Central Oregon lands and resources. In his final report, Abbot concluded that

the region was unlikely to develop economically as it was "separated from the rest of the world by almost impassable barriers" and offered "very few inducements to settlers" (Brogan 1964:236).

Despite Abbot's admonition, settlers did come. Most of the early immigrants of the 1840s and 1850s, however, did not stay. Most immigrants went through Central Oregon from the east on their way to the more fertile lands of the Willamette valley. But by the 1860s a network of roads and trails were beginning to form throughout Central Oregon as settlers took up lands within valley basins and miners headed to the gold camps in the John Day country. Entering the area from California to the south, miners traveled the Yreka Road to the John Day gold fields while settlers in covered wagons, often pushing herds of cattle, swine or sheep, crossed the Cascade Mountains through Santiam Pass following the Willamette Valley Cascade Mountain Military Wagon Road or over the McKenzie or Scott's Trails. The Dalles to Canyon City to Boise Road also witnessed thousands of immigrants entering Central Oregon not only south from the direction of The Dalles but east from Boise as well (Lebow, *et al.*, 1990:74). Still another important north/south arterial, known as the Huntington Road, was developed for transporting goods from Fort Dalles to Fort Klamath after the establishment of the Klamath Indian Reservation in 1864.

Arrival of large numbers of settlers had a tremendous impact on the lifeways of Indian people living in the area. As a result of those impacts, tensions mounted between the two cultures and eventually escalated into the conflict known as the Snake Wars (Lebow *et al.*, 1990:75). With the outbreak of that conflict, in 1859, numerous military garrisons were established along the Willamette Valley Cascade Mountain and The Dalles Military Roads. In Central Oregon those garrisons included Camps Polk, Gibbs, Watson, and Maury (Preston 1977:60). Established to protect miners and settlers and keep lines of communication open, troops occupied those posts sporadically until the end of hostilities in 1868.

White settlement spread out to all areas that would seemingly support farming or ranching in Central Oregon at the close of Indian/White hostilities. Cattle and sheep herding expanded in the 1870s from the previous decade, though it would not reach large scale proportions until the end of the century (Lebow *et al.*, 1990:75). Far more important, however, was the development of towns and rural communities during the final quarter of the 19th century and continuing into the first two decades of the 20th century. It was during that period that all of the communities known to exist in the area today were established: Prineville in 1871; Bend in 1886; Madras in 1903; and Redmond in 1905 (McArthur 1982:54, 218, 606, 616; Clark 1981:37). Many other rural post office communities with names such as Haystack, Lamonta, Grizzly, and Millican were also established during that period but have all but disappeared with the passage of time.

After the turn of the 20th century, the growth and economic development of the larger, more established, Central Oregon communities were substantially secured due to the occurrence of three primary events. These were the construction of a network of irrigation canals; completion of the Oregon Trunk Railroad to Bend; and the construction of two large, Minnesota-based, sawmills in Bend.

Promoted by railroads, irrigation companies, and local land developers as a "fertile tract of land capable of high cultivation," many people were lured to Central Oregon with the hopes of turning 320 acres of government land into a bountiful garden (Allen 1987: 34; Clark 1981:56, 112). By 1913, new communities with names like Imperial, Stauffer, Hampton, Brothers, and Fremont appeared all across the area "to serve homesteaders whose cabin lights on winter evenings glittered like fireflies in the sagelands" (Brogan 1964:143). Irrigation did enhance the agricultural potential of Central Oregon and continues to do so in the present. But most homesteaders who arrived in the area after the turn of the 20th century were forced to take up marginal lands with little access to naturally occurring water or those which were outside the reach of irrigation systems.

Many people left the area after facing short growing seasons, lack of water, hordes of jack rabbits and dry rocky soil (Allen 1987:91; Clark 1981:56-63; Coe 1939:228-237). It was fortunate for many of those ill-fated homesteaders that two large saw-milling outfits in Bend, Oregon, began operations in 1916. Those new mills, and their associated logging camps, offered many people the prospects of a new beginning at a steady job with a reliable income (Allen 1987:85, 99; Gregory 2001:44).

During the greater part of the 20th century, Central Oregon's population growth and economic development hinged upon agricultural and timber industries; industries whose activities largely depended on BLM administered lands for resource extraction. Although still important to various elements of local economies, those industries had greatly diminished by the close of the 20th century to be replaced by yet another industry tethered to use of the public domain– the recreation industry.

Current Social Setting

The planning area occupies two separate portions of Central Oregon and contains about a sixth of the geographic area of Crook County, a quarter of Deschutes County, a small portion of southern Jefferson County, and a small portion of Klamath County. This area includes or is adjacent to the most populated area in eastern Oregon, and has experienced one of the highest growth rates in the state. The population of Crook County is 19,182, an increase of 36 percent from 1990, the majority of which reside in the planning area. About half of the 115,367 residents of Deschutes County live within the planning area. The number of residents in Deschutes County has increased by 54 percent since 1990. The population of Jefferson County is 19,009, an increase of 39 percent from 1990. A small area of northern Klamath County is also in the planning area.

The descriptions of the existing conditions emphasize Deschutes and Crook Counties as representative of existing conditions in the planning area since about 93 percent of the planning area is in these two counties.

Crook County covers an area of about 1,914,200 acres in the geographic center of Oregon. While similar in size to neighboring Deschutes County (Crook County ranks 12th largest in size among Oregon's 36 counties, and Deschutes County ranks 11th largest), the population of Crook County is only about 1/6th that of Deschutes County. Land ownership in the county is evenly split between the public and private sectors, with about 48 percent privately owned and about the same amount in federal ownership. Land use in the county is primarily devoted to agriculture and forestry. According to the Oregon Employment Department (2001), Crook County's economy and employment remains heavily dependent on lumber and wood products manufacturing, which account for 24 percent of non-farm employment. A study of communities in the Upper Columbia River Basin ranked Prineville (the Crook County seat) as "high" for specialization in the category of wood product manufacturing employment (USFS and BLM, 1998). The employment and population figures help describe the local context for BLM decision-making in Crook County — a county experiencing rapid population growth but also grounded in its history of "wide open spaces" and natural resource-based economy.

Deschutes County covers an area of 1,955,200 acres, of which 80 percent is in federal ownership. Although lumber and wood products still comprise about 39 percent of manufacturing in the county (Oregon Employment Department, 2001), rapidly growing urban centers in Deschutes County, notably Bend and Redmond, are becoming increasingly less specialized as service, construction, and other employment sectors grow. Neither Redmond nor Bend ranked "high" in any employment specialization categories evaluated in the Upper Columbia River Ecosystem Management Project report (USFS and BLM, 1998). Preister (2000) reports two dominant and contradictory social themes in areas studied near Redmond, Sisters, and Bend: part of the community expressed grave

concerns about regional growth, while other community members expressed excitement about community and economic growth in the region. Observations in the planning area in southern Deschutes County near the unincorporated community of La Pine showed that residents are drawn to the area to live in a scenic, rural community in semi-seclusion, with more dispersed settlement patterns of residents scattered throughout the mountains, woods, and back country areas (Preister, 2000).

The Central Oregon Community Investment Plan (COCIP, [Central Oregon Intergovernmental Council, 2002]), was heavily relied upon to summarize population, income, and other socioeconomic data for Central Oregon counties. The data presented from this and other sources show the changing nature of the local social and economic landscape in the planning area with:

- Population growth rates above average for the state until 2020 or beyond;
- A more ethnically diverse population;
- An older, more educated population with more disposable income;
- An increase in the average income of residents and an increase in the number of people living in poverty;
- An increase in the diversity of jobs; and
- An increase in the cost of housing.

Social and Economic Overview

Population, Demographics, and Growth

According to the 2000 Census data, the population of Crook County had reached 19,182, and the population of Deschutes County had reached 115,367 (Table 3-1). During the previous 10 years, Deschutes County had the highest overall percentage population change in the state (53.9 percent increase), steadily adding an average of 4,041 people per year. Crook County ranked 5th in the state for percentage of population change (36 percent increase), and has added an average of 507 people per year in the last 10 years (Central Oregon Intergovernmental Council, 2002). People moving into both counties accounted for about 90 percent of this population growth (Oregon Employment Department, 2001).

Prineville and Redmond are the only two incorporated cities located within the planning area, although the City of Bend is located immediately adjacent to the planning area. Both Redmond and Bend are among the 20 fastest growing cities in Oregon. Bend, the Deschutes County seat, has a population of 52,029, making it the largest city in eastern Oregon.

The Central Oregon region is expected to continue to grow at a faster rate than the rest of the state through 2025 (Table 3-2). Based on data from the Center for Population Research and Census at Portland State University (Portland State University, 2003), about 75 percent of the area-wide population increase through 2010 will be due to in-migration.

The planning area will also be affected by nearby fast-growing cities outside of the planning area, such as Bend, Madras, and Sisters, as well as developing, but as yet unincorporated, areas within the planning area. Powell Butte, O'Neil, Terrebonne, Tumalo, Wickiup Junction, La Pine, and Alfalfa have all been designated "Rural Service Centers" by the counties and are areas of anticipated future growth, as are many of the developed and developing residential communities within the counties.

Table 3-1. Population Profile

Population	Crook	Deschutes	Both Counties	Oregon
1990	14,111	74,958	89,069	2,842,321
2000	19,182	115,367	134,549	3,421,399
2000 Race/Ethnicity Distribution*				
White	93.0%	94.8%	94.5%	86.8%
Black	0.0%	0.2%	0.2%	1.7%
American Indian	1.3%	0.8%	0.9%	1.2%
Asian/Pacific Islander	0.4%	0.8%	0.7%	3.1%
Hispanic	5.6%	3.7%	4.0%	8.0%
Other	3.8%	1.4%	1.7%	4.2%
2000 Age Distribution				
0 – 17	26.6%	24.8%	25.1%	24.8%
18 – 64	58.7%	62.1%	61.6%	62.8%
65+	14.7%	13.1%	13.3%	12.8%

*NOTE: The six percentages may add to more than 100 percent because individuals may have reported more than one race/ethnicity.
SOURCE: Portland State University (2003) and U.S. Census Bureau (2001).

Table 3-2. Population Forecast

State/County	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
Oregon	3,132,000	3,406,000	3,631,000	3,857,000	4,091,000	4,326,000	4,556,000	4,776,000	4,988,000	5,193,000
Both Counties	109,800	130,014	151,491	171,445	189,123	205,126	216,279	224,571	231,129	236,641
Crook County	15,700	17,168	18,662	20,215	21,892	23,678	25,582	27,567	29,634	31,752
Deschutes County	94,100	112,846	132,829	151,230	167,231	181,448	190,697	197,004	201,495	204,889

State/County (% Growth)	95-00	00-05	05-10	10-15	15-20	20-25	25-30	30-35	35-40
Oregon	9%	7%	6%	6%	6%	5%	5%	4%	4%
Both Counties	15%	14%	12%	9%	8%	5%	4%	3%	2%
Crook County	9%	9%	8%	8%	8%	8%	8%	7%	7%
Deschutes County	20%	18%	14%	11%	9%	5%	3%	2%	2%

SOURCE: Oregon Department of Administrative Services (2003).

Ethnicity

The racial composition of the population in the counties is relatively homogenous compared to the state population (Table 3-1). Data from the 2000 Census show that about 93 percent of the residents of Crook County are white, as are almost 95 percent of the residents of Deschutes County. Since 1990, the relative percentage of white residents has decreased slightly as the percentage of minority groups has increased, with the highest increases being Hispanic or Latino (2 to 3 percent) (Oregon Employment Department, 2001; BLM, 2001a).

Age

About 61 percent of the population of Crook and Deschutes Counties is working age (age 18 to 64), 25 percent is age 17 and under, and 13 percent is age 65 and over (Table 3-1). The median age is 38.6 for Crook County and 38.3 for Deschutes County, both higher than the median age in Oregon (36.3) and the nation (35.3). This may be due to the attraction of the area to retirees (such as La Pine, where the median age is 44.7 [BLM, 2001a]) and the general trend of population growth due to in-migration rather than an increase in area births over deaths (Deschutes County Community Development Department, 2003).

Income

The U.S. Department of Commerce, Bureau of Economic Analysis (BEA) estimates that earnings (such as wages and salaries) and dividends accounted for 60.3 percent and 26.5 percent, respectively, of the region's total personal income in 2000. By comparison, statewide earnings and dividends accounted for 65.7 percent and 21 percent of total personal income. Transfer payments (such as unemployment or social security payments) were about the same for the region and the state (Bureau of Economic Analysis, 2003). The higher proportion of dividend income by regional residents may reflect a relatively wealthy retiree and in-migrating baby-boomer population in the region as compared to the state as a whole.

According to the COCIP, inflation-adjusted per capita personal income experienced an increase equal to that of the overall Oregon economy for the last 10 years in Deschutes and Crook Counties (COIC, 2002). Deschutes County has the highest per capita income in the region, and in 2000, Deschutes County had the 5th highest per capita income in the state ($26,594 for the County compared to $27,836 for the state). Crook County dropped from 22nd statewide in 1990 to 29th in 2000 ($20,264), due in part, the COCIP reports, to the decline in the wood products industry (COIC, 2002; Bureau of Economic Analysis, 2003). The COCIP projects that, with the national economic downturn, per capita income rates in Central Oregon are in danger of showing a decline for the first time since the early 1980s.

Housing

According to the COCIP, Deschutes County is the most expensive area in which to purchase a new house in or adjacent to the planning area. The average sales price for a residential house in 2000 was $194,953 in Bend; $122,982 in Redmond; $100,517 in La Pine; and $99,196 in Crook County. The COCIP also reports that Crook County experienced a notable increase in the number of building permits issued in 2000 (after decreasing by 13 percent the previous year); but that new permits slowed in 1999 and 2000 for Deschutes County, where new permit acquisition was strong in 1997 and 1998.

While the exact dollar value may be difficult to quantify, open lands have been shown to boost property values for surrounding developed areas and:

- Provide agricultural jobs and sales;
- Form a link to an historic past
- Offer recreation opportunities;
- Provide habitat for native plants and wild animals;
- Replenish groundwater and act as a filter to improve water quality;
- Offer a scenic backdrop for a tourist economy; and
- Enhance the quality of life of area residents.

Proximity to BLM administered lands is used in advertising for many of the newer residential areas and resorts in and near the planning area. Local real estate agents report that properties adjacent to BLM lands sell for higher prices than similar properties that

are not located next to BLM land (Korish, personal communication, 2003). Responses to a recent BLM survey indicate that residents felt that proximity to public land increased the value of their property, and 76 percent of survey respondents living immediately adjacent to BLM expressed this opinion (Community Planning Workshop, 2002).

Amenity Values

Amenities can be defined as qualities of a locality that make it an attractive place to live and work (Power, 1988). Examples include wildlife and flora, recreational areas, pristine or undisturbed wilderness, unique settlement patterns, agricultural or cultivated landscapes, historic sites, and social and cultural traditions — all of which can be found on BLM-administered lands within the planning area. Amenities provide utility to people through the direct consumption of specific aspects of land, natural resources, and/or human activity (OECD, 1994). Amenities are linked to a particular region and are immobile.

Amenity values provided to Central Oregon residents by proximity to BLM-administered include qualitative, and often subjective, measures such as diverse outdoor recreation opportunities, pleasant views, privacy, seclusion, and peace and quiet. Specific amenities associated with BLM administered lands in the planning area include open vistas of distant Cascade Peaks and local buttes; a sense of historical continuity from cultural sites and ranching and agricultural landscapes; opportunities for wildlife viewing; scenic drives and highways; developed and undeveloped recreation options; and an escape and refuge from urban areas. As private lands in the area become developed, residents will increase their reliance on BLM administered lands and public land managers to provide, maintain, and protect these amenities.

Such features contribute to the overall quality of life in the planning area, and are often listed as valuable features by residential and resort communities.

Managing Change

The USFS and BLM analyzed economic and social characteristics of 543 communities in 98 counties and six states in the Columbia River basin to aid in identifying communities they may be economically and socially vulnerable to shifts in the management of USFS and BLM lands (USFS and BLM, 1998). Researchers analyzed all the communities to assess their geographic isolation from larger cities and their association with USFS and BLM-administered lands, and examined economic information for 423 of these communities to determine their degree of industry specialization. The study included Prineville in Crook County as well as Bend, Redmond, Sisters, Terrebonne, and Three Rivers in Deschutes County. The report concluded that it was difficult to establish the importance of federal land to the local economy as "…there are simply too many other variables affecting this relationship and these variables can change quickly. There are also private choices involved in how businesses plan for and rely on federal lands for materials and services."

Regional Economy

In this report, no attempt has been made to evaluate a measure of Gross Regional Product. Instead, the general economic welfare of the region is described and evaluated using secondary data, as presented below.

Revenue Sharing With Local Governments

Although public land is not subject to state or local property taxes, the state of Oregon and Crook and Deschutes Counties receive revenues from BLM-administered lands

located within their boundaries through several federal programs aimed at fairly compensating states and counties. These programs include formulas for direct revenue sharing (through commodity use or sale of natural resources on federal lands) and payment in lieu of taxes (PILT). Table 3-3 presents revenue sharing figures for all BLM-administered lands in Crook and Deschutes Counties for mineral leasing, and Section 15 grazing leases (note, however, that revenues from these activities on lands within the planning area would be less than that shown in Table 3-3 because BLM-administered lands within the planning area are only a portion of BLM-administered lands within each county).

Revenues from the PILT program compensate Crook and Deschutes Counties for the non-taxable nature of federal lands within their borders. The PILT program provides Crook and Deschutes Counties up to $0.75 per acre for entitlement lands within their boundaries; these amounts are reduced each year to a minimum of $0.10 per acre by payments received by the county from various natural resource revenue sharing programs (mining, grazing, timber, etc.) in the previous year (Frewing-Runyon, personal communication, 2003a). For BLM fiscal years 1999 to 2001, BLM paid an average of $520,000 to Crook County and $180,000 to Deschutes County under the PILT program for lands managed by the BLM in these counties. Because BLM administered lands within the planning area are about one quarter of BLM's total land base in Crook County and one half of the land base in Deschutes County, 1999 to 2001, average PILT payments associated with BLM administered lands within the planning area can be roughly estimated as $126,000 for Crook County and $90,000 for Deschutes County.

Industries

According to the Oregon Employment Department, Central Oregon experienced healthy job growth throughout most of its industry sectors in the 1990s. Only one sector, the lumber and wood products sector, experienced a decline (Oregon Employment Department, 2001). The region is experiencing an economic shift away from traditional commodity-based sectors such as timber, livestock, and agriculture, which have experienced substantial declines statewide. The rural community economies have resiliently shifted toward trades and service sectors fueled by recreation, tourism, and retirement incomes, and the influx of new residents is providing a diverse labor force to fuel this economic shift (Preister, 2000).

The COCIP reports that the nature of Central Oregon's wood products industry is changing, along with the statewide and regional decline in timber harvest over the last decade (Central Oregon Intergovernmental Council, 2002). What once made up the

Table 3-3. BLM Payments to Crook and Deschutes Counties, 1999 to 2001

Year	Payment	Crook County	Deschutes County
1999	Mineral leasing	$207	$1,987
2000	Mineral leasing	$209	$2,013
2001	Mineral leasing	$104	$1,076
1999	Sec. 15 Grazing Leases	$273	$1,161
2000	Sec. 15 Grazing Leases	$272	$304
2001	Sec. 15 Grazing Leases	$275	$136

SOURCE: BLM (2001b).

majority of the area's manufacturing base (lumber and wood products) is declining in overall percentage and evolving into smaller, niche-market manufacturing companies. Lumber and wood products manufacturing accounted for 24 percent of non-farm employment in the year 2000 in Crook County and 39 percent in Deschutes County (Oregon Employment Department, 2001).

BLM employment and salaries are included in the government category in Table 3-4, but activities on BLM administered lands also directly contribute to agriculture, manufacturing, and mining sectors. Although relatively small contributions compared to other area lands and industries (as discussed in future sections of this document), BLM grazing leases, gravel pits, timber, and other forest products do contribute to the local economy. According to a recent BLM survey, 68 of the 667 survey respondents (10 percent) indicated that they relied on BLM administered lands for economic gain (grazing, craft industries, forest products, etc.). Although no distinction was made between BLM-administered lands within the planning area and BLM-administered lands outside the planning area (Community Planning Workshop, 2002). Of all respondents, 11 (1.6 percent) indicated that they rely on BLM-administered land as their sole means of income (Community Planning Workshop, 2002).

Although no distinction is made between public and private lands, IMPLAN data estimates for Crook and Deschutes Counties show that livestock (for all animals, including range-fed and ranch-fed) accounts for about $31.2 million of the agricultural sector's $143.7 million in output and 944 of agricultural sector jobs. IMPLAN also estimates that the range-fed cattle sector generates about $13.6 million dollars of output and 335 jobs are generated annually (MIG, Inc., 2000).

In both Crook and Deschutes Counties, employment in the service industry and retail trade is expected to outpace growth in other economic sectors through 2010 (COIC, 2002). Table 3-4 presents data on the relative importance of the major economic sectors on the

Table 3-4. Economic Activity by Major Economic Sector for Deschutes and Crook Counties

	Industry Output ($ millions)	Employment	Value Added ($ millions)
Agriculture	143.7	3,906	100.1
Mining	39.6	91	20.9
Construction	1,066.7	8,936	386.2
Manufacturing	1,360.1	8,526	501.3
Transportation/ Communications/ Public Utilities	473.2	2,897	245.2
Trade	1,015.1	19,573	722.4
Financial/Investment/ Real Estate	1,233.5	6,985	869.7
Services	1,417.4	24,603	790.7
Government	515.7	9,213	457.4
Other	-11.6	296	-11.6
Totals	**7,253.4**	**85,026**	**4,082.5**

NOTES: All figures adjusted into 2002 dollar terms using the Consumer Price Index – Urban. Industry output represents the dollar value of an industry's output. Value added represents the total earnings and other income associated with a business sector (employee compensation, proprietary income, other property income and indirect business taxes).

SOURCE: IMPLAN Input Output Model by MIG, Inc. for Deschutes and Crook Counties (MIG, Inc. 2000) and Environmental Science Associates.

regional economy, both in terms of economic output, employment and value added (value added being the total earnings and other income, such as indirect taxes, associated with a particular business sector). The importance of the trade and service sector to the region's economy is shown by the fact that these sectors account for more than half of the employment in the region. The major role also played by the finance/real estate and construction industries is clearly related to the past and on-going development occurring in the region.

Over the last 20 years, there has been a substantial increase in resort development within the two-county region. The combined effect of favorable economic and demographic trends has created increased demands for second home and resort development. Fueled by demographic shifts, wealth creation, and inheritance, the resort industry is forecast to be the fastest growing real estate market over the next 20 years (Hobson Ferrarini Associates, Inc., 2000).

The growth in local resort development has had both beneficial and adverse social and economic effects on the counties and other local communities. The increased population from the new housing stock both increases the local tax base and increases the demand on county and local services. According the Deschutes County Economic Development Department, the past resort developments have generally had a major positive economic impact on the regional economy (Lee, personal communication, 2003). According to the Deschutes County Tax Assessor's Office, the combined real market value of the Sun River Resort community in 2002 was about $1,267 million, and it paid about $12.1 million in property taxes to the county (Reynolds, personal communication, 2003). For the Black Butte Ranch resort community, its real market value was estimated to be about $512 million and it paid $5.7 million in combined property taxes to the county. Resort developments also generate many jobs for the region (although most are relatively low-paying service sector positions). The Deschutes County Economic Development Department estimates that the major resorts (including Mt. Bachelor Ski Resort) directly employ nearly 3,200 employees.

While numerous factors contribute to the location and success of destination resorts (land availability, quality of construction and amenities, etc.), the open space and scenic quality surrounding the resorts are considered to be additional factors attracting visitors and residents to the resorts. As a result, BLM-administered lands contribute toward the success of these developments. While the majority of the recreational facilities used by resort guests or residents are located within the resort property, some resort users and residents may be expected to use adjoining BLM recreational resources.

Tourism and recreation are important sources of revenue for the region. The area's magnificent scenery and clean environment, as well as varied recreation locations and opportunities, has made it a popular year-round vacation area. Dean Runyon and Associates estimates that tourism spending within the two-county region resulted in more than $375 million of spending — with Deschutes County ranking 5th in the state in terms of highest total tourism related spending (Dean Runyon and Associates, 2002). The report also estimates that tourism accounted for more than 6,600 jobs in the region.

Deschutes County annual Transient Room Tax revenues were $5.22 million (for incorporated areas) and $3.0 million for the unincorporated sections of the county in 2002. Based on an average tax rate of 7 percent (and an 8 percent tax rate for Bend), it is estimated that there were about nearly $71.5 million in total lodging sales in Deschutes County. In comparison, during the same period, Crook County collected only $110,000 in transient room tax revenues.

According to the Deschutes County Treasurer's Office and Economic Development Department, resort developments have become an increasingly important component of the region's economy over the last 20 years and are expected to remain so for the

foreseeable future (Circle, personal communication and Lee, personal communication, 2003). The Treasurer's office estimated that more than 80 percent of the County's estimated $3.0 million in Transient Room Tax revenues were generated from lodging on properties that were part of the Sunriver, Black Butte, or Eagle Crest Resorts. According to the Deschutes County Tax Assessor's Office, three of the top six tax payers in the County are Eagle Crest Resort, Sunriver Resort, and Mt. Bachelor, Inc. (the ski resort is considered a major recreational and resort amenity). These tourism businesses have a combined real market value estimated to be over $121 million (not including the value of properties sold by the resort to private owners).

Labor Force

IMPLAN reports that full and part-time employees (including self-employed) equal about 85,000 in Deschutes and Crook counties.

Unemployment in Central Oregon hit a 30-year low in 2000, but as a result of the slowing economy in 2001, rose again to 7.4 percent by November of 2001 (the highest since July 1993) (COIC, 2002). The Oregon Employment Department attributes the higher unemployment rates in Central Oregon (relative to the rate for the entire state of Oregon) to three factors: 1) the decline of the lumber and wood products sector; 2) high job growth in seasonal non-manufacturing sectors; and 3) accelerated growth in the region's population (COIC, 2002).

Crook County unemployment rates are the highest and most volatile in the region, but unemployment rates for both Crook and Deschutes Counties have consistently been higher than the rates for the entire state. Despite these high unemployment rates, the actual number of people employed has grown considerably between 1994 and 2000, with 17,471 new jobs created in Deschutes County and 1,061 new jobs in Crook County (COIC, 2002).

Infrastructure

Five general aviation airports are located in Crook and Deschutes Counties. They include the Prineville Airport, Roberts Field in Redmond, Bend Municipal, Sunriver Airport, and Sisters Eagle Air. Roberts Field, owned and operated by the City of Redmond, is the only commercial airport with regularly scheduled passenger service in Crook and Deschutes Counties (and the planning area). Roberts Field is an important asset to the tourism industry in Crook and Deschutes Counties, especially for attracting out-of-area visitors. Regularly scheduled flights from Roberts Field to Portland, Seattle, and San Francisco allow travelers to connect to worldwide destinations. Enplanement data show steadily increasing numbers since 1994, except from 2000 to 2001, which may be due, in part, to the events of September 11, 2001. Total enplanements in 2000 totaled 161,680 and 158,670 in 2001 (COIC, 2002). BLM-administered lands near the airport also may be viewed as a potentially important resource to allow for future airport expansion or development of near-airport commercial, industrial, and public facilities.

Additional infrastructure is described under Transportation and Utility Corridors in this Chapter.

Issue Based Descriptions of the Affected Environment

Ecosystem

An ecosystem is a complete interacting community of living organisms and the abiotic components that make up their environment. An ecosystem can be something as small and discrete as a pond or a single log, or it can be the entire earth's biosphere. The purpose of ecosystem management is to maintain the integrity of ecosystems over time and space. Ecosystems are dynamic, and are constantly changing with or without human influence. Ecosystems have biophysical limits, which are sometimes at odds with social expectations, and there are limits to our ability to accurately predict how things may change (Haynes *et al.*, 1996).

The Interior Columbia Basin Integrated Scientific Assessment studied historical and current ecological conditions at a broad scale. At the sub-basin scale, the Upper Deschutes planning area, along with much of the Interior Columbia Basin, was shown to have "low composite ecological integrity" based on disturbance to expected vegetative patterns and composition, altered hydrologic function, presence of exotic species, and changes to historic disturbance relationships in the forestlands, rangelands, hydrologic systems, aquatic character, and terrestrial species habitat (USFS, 1996). This composite rating emphasizes ecological process and function, rating human altered systems lower, although they may or may not be productive and be meeting social expectations.

Vegetation

This section describes the broad vegetative types within the planning area, including important features and trends of each. The ecological role of disturbances, both natural and human caused, will be discussed. Special status plants and noxious weeds, although occurring in all the vegetative community types, will be described under separate subsections.

The planning area lies on the eastern shoulders of the Cascade Range in a broad vegetative transition zone, along a precipitation gradient between forested ecosystems on the west and the high, dry shrub-steppe environment common to the Great Basin. The planning area may be characterized by several major distinct vegetative community types (See Map 4: Vegetation Types, and Table 3-5). The northern area is primarily

Table 3-5. Vegetative Types in the Upper Deschutes Planning Area

Vegetative Group	BLM Acres	Total Acres in Planning Area	BLM Acres(%)	Total Acres, All Ownerships(%)
Shrub	213,654	362,362	52.3	41.0
Juniper	132,969	278,647	32.5	31.5
Pine	26,787	76,571	6.6	8.7
Grass	19,565	62,547	4.8	7.1
Ag/Riparian/Meadow	12,008	87,494	2.9	9.9
Non Vegetated	3,399	11,959	.8	1.4
Mixed Conifer	513	4,147	.1	.5
TOTALS	**408,895**	**883,727**	**100**	**100**

a mosaic of juniper woodland and sagebrush/grassland, while the La Pine area is dominated by lodgepole pine forest with bitterbrush in the understory. Ponderosa pine dominates the overstory in small areas in both the La Pine and northern portion of the planning area where the vegetation transitions between mixed conifer and juniper woodland. Riparian plant communities lining the rivers, creeks, and irrigation canals are relatively minor in terms of total acres in the planning area, but extremely important as wildlife habitat and popular for recreational use.

Disturbance Relationships

Disturbance relationships are important because ecosystem properties are often regulated by the type, severity, size, and frequency of the disturbances that occur. Individual plant communities align themselves according to soil properties and available precipitation in a moisture limited environment, but the composition and arrangement of the individual plant communities are also influenced by the presence or absence of natural and human caused disturbances.

Natural disturbances include wildland fire, drought, wind, and climate anomalies. The presence of insects and pathogens following a disturbance is also a factor in, or a symptom of, many of the forest health issues currently being experienced in the west. The La Pine area, in particular, has been severely altered by a variety of disturbance factors including insects and disease, wind, drought, fire (including fire exclusion), and human activities. The interaction of fire exclusion, insects and disease, logging, and a proliferation of lodgepole seedlings, saplings and bitterbrush has created pressing concerns for wildland fire hazard and ecosystem health in the La Pine area.

Of the human-caused disturbances, some are caused by the direct disruption of plant communities during activities such as logging, juniper thinning, prescribed fire, livestock grazing, off-road travel, and road construction. Others are caused by unplanned human activities such as wildland fire. Human ignitions have accounted for 81 percent of the 62 fires within the past 20 years in the La Pine area, and 19 percent of the 685 ignitions in the northern portion of the planning area. Finally some disturbances are caused by human activities inhibiting natural disturbances such as suppression of wildland fire. Roads also act as fire breaks, further changing the environment in which fire can burn. Grazing can reduce the amount of available fine fuel in which fire can burn, a shift in the inherent disturbance regime. These human disruptions of the natural fire regime result in increased fuel loading, shifts in species composition and abundance, and an overall increase in fire severity when a wildland fire does occur.

Shrub-Steppe Communities

Shrub-steppe and western juniper communities are the most prevalent within the northern portion of the planning area (the planning area excluding the La Pine area), as well as throughout Central Oregon. The term “shrub-steppe” refers to the complex of plant communities that are dominated by shrub and grass species in various proportions, usually occurring in the more xeric sites. The shrub-steppe and juniper woodland vegetative types comprise 90 percent (366,370 acres) of the BLM-administered lands in that northern portion of the area. The juniper woodland communities are similar in composition to the shrub-steppe communities, differing primarily only in the presence of the western juniper tree overstory. For the purposes of discussion in this section, the two communities will be described separately. The shrub-steppe discussion will focus on the shrub, grass, and forb components, while the juniper woodland discussion will focus on the tree component. The juniper woodland section will further discuss the dynamics of juniper occupation and describe the stands of old-growth juniper present in the planning area.

Sagebrush or western juniper dominate most plant communities the northern area. There are several sagebrush species in the planning area, each of which characterizes particular habitats. The two most important sagebrush communities in the planning area are the big sagebrush and low sagebrush communities.

Big Sagebrush

This plant community includes mountain big sagebrush, Wyoming big sagebrush, and basin big sagebrush as the dominant shrubs, with mountain big sagebrush as the most widespread. Big sagebrush communities dominate the shrub layer on approximately 90 percent (329,730 acres) of the shrub-steppe/woodland vegetative type in a wide variety of mixed plant association mosaics. Big sagebrush crown cover is generally within the range of 10-30 percent. Basin big sagebrush grows on sites having moderately deep, well-drained loamy soils such as those occurring on droughty bottomlands and fans. Wyoming big sagebrush is present throughout the uplands of the shrub-steppe vegetative type on slightly more sandy or gravelly soils. Mountain big sagebrush generally occurs on higher elevations than basin big or Wyoming big sagebrush, dominating on sites above 4,200 feet in gravelly or stony soils. Mountain big sagebrush often mixes with Wyoming big sagebrush, particularly in the pumice zone on the western portion of the northern area. Mountain big sagebrush occasionally includes low sagebrush on some of the stony flat "scabs."

Few trees occur on mountain big sagebrush sites while juniper and ponderosa pine can be common on the more mesic and lower elevation basin and Wyoming big sagebrush sites. Juniper overstories can attain up to 40 percent crown cover over big sagebrush communities. Pine occurs in isolated groups and at the northwest edge of the northern area.

Antelope bitterbrush is also often a component on the more mesic sites, particularly on the west edge of the northern area, the skeleton area, and south Millican area. In these areas, bitterbrush can be dominant or co-dominant with big sagebrush. Green and gray rabbitbrush also often occur in association with big sagebrush. Rabbitbrush is an early seral species, with the greatest occurrence on disturbed sites.

Grass and forb associations with big sagebrush vary widely, depending on the specific site. The presence of naive grasses can range from a mere presence to an abundance of grass depending on soil/water relations and historical disturbances on the site. The grass component is generally dominated by bluebunch wheatgrass, Idaho fescue, or needlegrass. Idaho fescue generally increases as one moves north and west in the planning area toward a lower elevation and greater soil moisture gradient. Idaho fescue also favors north slopes and, on deeper soils, the shade of tree canopies. Western needlegrass is dominant at the higher elevations and where soils are sandier. Other grasses occurring in association with big sagebrush communities include needle and thread grass, Thurber's needlegrass, Sandberg's bluegrass, bottlebrush squirreltail, Junegrass, and Great Basin wildrye.

Introduced grasses are primarily cheatgrass and crested wheatgrass. Approximately 6,400 acres of public land within the planning area were seeded with crested wheatgrass in the 1950s-70s. Crested wheatgrass was seeded to stabilize soil, help displace undesirable species, and increase forage production for livestock and wildlife. Introduced from Eurasia, crested wheatgrass is well adapted to the local climate and soils and many seeded areas still support varying densities of this species. After about 10 years, big sagebrush and rabbitbrush begin to re-establish within crested wheatgrass seedings.

Forbs are a minor component in big sagebrush communities, usually comprising less than 2 percent in an area. Near Bend, where the sandy soils are deeper, there is a greater frequency of species such as Douglas' false-yarrow, Oregon sunshine, and

lineleaf phacelia. As soils lose depth and become rockier, as is common at the higher elevations and scab flats, various milkvetches, balsamroot, and Columbia puccoon increase in frequency. Various species of buckwheat, lupine, and milkvetches are common throughout the area. Other common forbs include common yarrow, Lewis' flax, Nutall's larkspur, granite gilia, wooly groundsel, rockcress, phlox, aster, and paintbrush. Microbiotic crusts, though inconspicuous, are important to the ecological integrity of some sites (see Soils section for more discussion of microbiotic crusts).

Low sagebrush

Low sagebrush communities occur on approximately 8 percent (29,310 acres) of the woodland/ shrub-steppe vegetative type within the planning area. This community is strongly dominant on upland shallow, stony, basalt-derived soils, but can also grow mixed with other sagebrush species on moderately deep, gravelly mountain soils. Low sagebrush typically has less than 10 percent crown cover and has a much lower growth form (4-16 inches) than big sagebrush. Low sagebrush is the dominant plant, and often the only shrub found in the community. Few trees are found on low sagebrush sites. Sandberg's bluegrass is often the dominant grass. Other common associate grasses are bluebunch wheatgrass and Idaho fescue. Common forbs include Hood's phlox, prairie lupine, lineleaf fleabane, false agoseris, bighead clover, and various species of biscuitroots and buckwheats. Low sagebrush sites usually do not form extensive landscape-level covers but, rather, are part of the larger big sagebrush mosaics. The sites have extensive areas of exposed rock with a very sparse total vegetative cover.

Most sagebrush communities are adapted to the passage of periodic fire. Fire in the unmanaged sagebrush ecosystem would have burned at intervals between 25 and 100 years, depending upon the availability of fine fuels and grasses to carry fire in this vegetative type (Wright & Bailey, 1982). The amount of grass and other vegetation to help carry fire is directly related to the amount of moisture available, and so the drier sites occupied by drought tolerant Wyoming big sagebrush and low sagebrush tend to have the least frequent fire return interval (100 years or more between fires) due to the lack of fine fuels that could carry fire in low wind situations. The more mesic mountain big sagebrush is more likely to be growing in the company of continuous grass and forb species that can carry fire. Fire return intervals in those ecosystems would be expected to be closer to 25 to 30 years.

We suspect that fire exclusion has played a role in the arrangement, vigor, and distribution of seral stage classes of these sagebrush communities, resulting in an overall loss of heterogeneity. A homogeneous ecosystem consisting of mature sagebrush across a broad area is more prone to larger fires, and the post burn environment is less apt to provide a mosaic of habitat opportunities for wildlife.

Two potential scenarios result from interruption of the natural fire cycle. One prevalent trend in the planning area is for sagebrush stands to become dense and unproductive, with few grasses in the understory and a high ratio of dead to live crown in the sagebrush. Often juniper becomes established as the loss of grasses makes fire's passage less likely. If the native perennial grass and forb component is lost and a severe fire does occur, then, lacking a native seed source, the risk for exotic species (such as cheatgrass and noxious weeds) dominance becomes quite high.

Another potential trend, less frequent but existing in the planning area, is for a non-native grass like cheatgrass to become established in the stand. Cheatgrass is extremely flammable, and some stands actually burn with much greater frequency, as often as every year or two. This cheatgrass-fire cycle is difficult to remedy once it has started.

Western Juniper Communities

The western juniper woodlands are the driest of all tree-dominated zones in the Pacific Northwest (Franklin and Dyrness, 1973). The range of western juniper extends throughout much of central and eastern Oregon and into other parts of the Great Basin. Juniper woodlands in Central Oregon are within the transition zone between the ponderosa pine forest on the east slope of the Cascades and the high desert shrub-steppe zone to the south and east. Juniper-dominated plant communities cover approximately 33 percent of the northern planning area, almost always in association with the big sagebrush shrub-steppe vegetative type. In this context, juniper "dominance" refers to areas where juniper density (crown cover) is 10 percent or greater. Juniper density on these sites generally ranges from 10-40 percent, depending on site characteristics and past disturbances such as wildland fire, prescribed burning, juniper thinning projects, old homestead clearings, personal-use and commercial firewood sales, and illegal firewood cutting. Plant species that grow between and underneath the juniper are generally the same as those that grow in the shrub-steppe (see description of shrubs, grasses, and forbs in the Shrub-Steppe section).

Western juniper is a highly competitive and invasive species (Rose and Eddleman, 1994). In the absence of fire, juniper has the ability to out-compete other plant species for limited soil moisture and nutrients. This long-lived species can transpire and grow during mild periods in the winter and early spring on unfrozen soils when other vegetation is dormant. Western juniper does not sprout (Burkhardt and Tisdale, 1976). Reestablishment is through seed that is dispersed fairly slowly by water and animals.

Western juniper has been expanding its range into adjacent shrub-steppes, grasslands, savannas, pine forests, and riparian/wetland areas during the past 100 to 150 years (Belsky, 1996), and it has doubled its range in central and eastern Oregon during the past 80 to 100 years. Western juniper expansion has been attributed to livestock grazing, which reduces the fine fuels required for effective fire spread, climatic changes (mild temperatures and above average precipitation in the late 1880s and early 1900s), and reduction in fire frequency due to fire suppression and cessation of Native American burning (Eddleman *et al.*, 1994; Miller and Rose, 1998; Miller *et al.*, 1995). These events resulted in conditions that were ideal for cone production and seedling establishment. Conditions that favor sagebrush also favors establishment of juniper since juniper uses sagebrush plants for seedling protection. Small isolated stands and groups of trees became large contiguous woodlands. Although the old-growth juniper woodlands have not expanded in range as with the post-settlement juniper, they have increased in density, mostly from in-growth of young trees (see discussion of old-growth juniper below).

Where fire returns frequently, juniper is a minor component in the plant community, existing in rocky areas or other places unlikely to burn. However, in the pumice flats of Central Oregon, fire played less of a role, and juniper is much more prevalent. Juniper is poorly adapted to survive the passage of fire. Young junipers have thin bark and are readily killed by surface fires. In general, the taller the juniper, the greater the severity of the fire required to kill it (Martin, 1978). Fire return intervals in western juniper communities range from 7 to 25 years to more than 100 years. Mean fire interval for western juniper within the Columbia River Basin is estimated at 52 years (Barrett *et al.*, 1997). European settler-induced changes to the ecosystem from fire suppression and grazing has resulted in a longer-term trend of decreasing fine fuels (grasses) and increasing woody fuels (shrubs and trees). This change in vegetative composition and structure has further reduced the natural ability of these sites to carry fire and, therefore, has lengthened fire return intervals.

Post-settlement juniper dominance of some sites can cause alterations to watershed function and ecosystem health. Local research and monitoring has demonstrated some of the implications of juniper dominance for a variety of ecological and physical processes

and values. Some of the ecosystem components/processes affected include: vegetation and wildlife species composition and diversity; bio-mass production; invertebrate and microbiotic changes; water interception, infiltration and runoff; soil temperature; and freeze/thaw processes.

Juniper is effective in using available moisture and uses water very early in the spring before other plants begin to grow. On a warm April day, individual trees can use up to 20 gallons per day. In a dense juniper stand, this water use represents a majority of the annual precipitation on a typical Central Oregon site. On juniper sites, soil moisture is often limiting for most perennial plants by June 15; whereas on sites without juniper, soil moisture is often available into August. On sites in Central Oregon, interception loss from the canopy cover was as high as 20 percent or two inches per year in a 10-inch precipitation zone (Eddleman and Miller 1991). Anecdotal information also suggests that juniper site dominance can change groundwater recharge capability; the timing, intensity and duration of stream runoff events; and total watershed water production and storage. Monitoring indicates that these kinds of effects occur in many juniper-occupied sites within the planning area.

Significant loss of shrub-steppe habitat quality has occurred from expansion of juniper and increases in sagebrush age and density. Historically, many upland sites in the north planning area were treeless grass and shrub communities or savannas containing a higher proportion of grass and widely dispersed trees. Local research and monitoring studies, rangeland health assessments, and other information dating back to the 1880s suggest a trend toward increasing dominance of woody species on formerly graminoid (grass)-dominated sites. Such woody species include western juniper, ponderosa pine, sagebrush, and rabbitbrush. Monitoring has also indicated that when post-settlement juniper and shrub cover/density is reduced (and appropriate post-treatment practices are applied), understory grass and forb cover/density, soil stability, and other desired ecological attributes can increase in quality and quantity. Shrub habitat can also improve with natural disturbance or treatment by becoming more diverse in age class, structure, distribution, and density. Successful treatment techniques that have been applied in the planning area to help reverse the trend toward expanding woody species dominance include prescribed burning, cutting, and altering livestock grazing schedules. Nevertheless, research in other areas of the west studying the effects of juniper and pinyon-juniper occupation on ecosystem health and functioning has resulted in differing viewpoints, conclusions, and recommendations.

Old-Growth Juniper Woodlands

The western juniper woodlands are often treated and discussed in general terms as a single vegetation type. In reality, there are many plant associations within the western juniper association group. Driscoll (1964) has classified nine relatively undisturbed plant associations and variants of two associations in the Central Oregon juniper zone. These juniper associations are representative of "climax" types, that is, as these plant communities approach their latter stages of successional development, western juniper is often present as a dominant component. Juniper often attains a great age on some of these sites. This stage of juniper development is often referred to as "old-growth woodlands."

Approximately 34 percent (139,000 acres) of the planning area contains old-growth juniper woodlands (see Map 4: Vegetation Types). The literature generally agrees that old-growth juniper is defined as juniper that was present before the migration of white European settlers into the region beginning in the mid- to late-1800s (i.e., trees greater than 150 years of age). This "pre-settlement" or old-growth juniper occurs in large contiguous stands in the Cline Buttes, Alfalfa, Badlands, Horse Ridge, and Millican Road areas. Many of the dominant trees in these stands are much older than 150 years, some approaching 1,000 years of age (Miller *et al.*, 1996). The oldest tree in Oregon, a western

juniper tree located within the planning area, was recently documented to be over 1,600 years old. Within the range of western juniper, it is estimated that 3-5 percent of the current 8 million acres of woodlands are characterized by trees greater than 100 years old (BLM 1990). Some of the physical characteristics of old juniper trees include: large diameter trunk (often twisted) and lower limbs, rounded or irregular crown, deeply furrowed, reddish stringy bark, broken and dead branches, heart rot, cavities, and abundant lichen growth. Old-growth stands are usually in an uneven-aged structure with younger trees occurring in disturbance areas and in interspace areas between the older trees. Central Oregon old-growth juniper has not been formally rated according to ecological significance criteria such as those developed for other tree species (i.e., USFS Region 6 Interim Old-Growth Definitions, Bill Hopkins, 1992).

Because many of these trees were already old centuries before European settlement, they are considered to be an integral part of the native Central Oregon landscape; compared to the recently established post-settlement juniper type, which is more of a manifestation of recent human and climatic influences. Therefore, old-growth juniper in this document will be considered in a different context than the younger juniper that have expanded into and adjacent to the old-growth stands. These old trees provide a variety of non-tangible values such as special wildlife habitat, interpretive/educational opportunities, high scenic values, and preservation of natural gene pools. The Central Oregon old-growth stands are unique because they are large and contiguous in area and contain a higher percentage of larger and older trees relative to other western juniper woodlands in the Great Basin.

The large size and age of juniper in Central Oregon is probably due to several environmental factors. The area has moderately deep pumice soils, more available subsurface soil moisture, and relatively few days during winter when soils are frozen compared to other western juniper sites in the high desert region. These factors allow juniper to out-compete other associated species on these sites. Fire may also play a factor on these sites. Low rainfall results in less fine fuels to carry fire. The flat to gently rolling topography also makes it more difficult for the spread of large, intense wildland fires. Larger trees have a tendency to "fireproof" themselves by creating a zone of sparse vegetation around them through competition and release of growth inhibitors. Older trees with thicker bark are described as "moderately resistant" to fire (Sowder and Mowat, 1965). Control of natural fires and overgrazing with the arrival of white settlers also limited the ecological role of fire in controlling the age and extent of juniper stands in Central Oregon (Burkhardt, 1996).

Healthy old juniper woodlands can be characterized as having a high proportion of native plants that are diverse and well distributed across the site, a healthy and vigorous understory with a low proportion of young juniper trees, low cover of non-native and annual plant species, a healthy component of microbiotic soil crusts, and a low level of physical ground disturbance. These sites contain a complementary healthy and diverse population of wildlife species. Healthy old woodlands exist within the planning area but their extent is diminishing.

Increasing urban development and human activities have fragmented old-growth juniper woodlands in Central Oregon. The removal of old-growth trees from private land makes remaining old-growth juniper woodlands on BLM administered lands more ecologically significant. Traditional public land uses such as cutting trees for firewood, off-road vehicle travel, military training exercises, clearing for road construction, and improper livestock grazing have contributed to the direct and indirect effects on these old-growth ecosystems. Hobbyists and furniture makers target these trees as a raw material source. These and other human activities, both legal and illegal, compromise the integrity of old-growth woodlands in Central Oregon.

Lodgepole Pine

Lodgepole pine plant communities are the dominant vegetative type in the La Pine Basin, comprising approximately 90 percent (36,121 acres) of the La Pine portion of the planning area. The most common plant community, by far, is the lodgepole-bitterbrush-Idaho fescue association. On some sites bottlebrush squirreltail and needlegrass are the dominant grasses, in association with lodgepole pine and bitterbrush. Other common understory plant species include wax currant, lupine, buttercup, western yarrow, strawberry, goosefoot violet, balsam groundsel, goldenweed, yellow salsify, silverleaf phacelia, kinnikinnick, and pinedrops.

The ecological status of lodgepole pine is typically that of a pioneer or invader species and is often replaced over time by other tree species such as ponderosa pine, grand fir, or Engelmann spruce. However, in much of the La Pine area, lodgepole pine is the climax tree species, meaning it persists over a long period of time and is not replaced by any other tree species in this environment. It thrives on disturbance and can establish quickly in an area disturbed by fire, windthrow, insects or disease. This relatively short-lived tree species is dependent on disturbance for its regeneration and long-term stand health and vigor. Lodgepole pine is able to become established and grow where other trees cannot compete or survive. This prolific species can germinate and grow in frost pockets, soils with high water tables, and soils with low fertility. One or more of these conditions are common on most sites in the La Pine area. Consequently, lodgepole pine dominates here in pure or nearly pure stands.

Mature lodgepole pine stands comprise 32 percent (12,843 acres) of the La Pine area. Mature stand structure varies considerably depending on the specific site. The mature stands in the planning area are typical of lodgepole pine in its latter stages of successional development. Generally, there is a remnant overstory of scattered larger trees up to 18 inches DBH and pockets of very dense understory reproduction (up to 5,000 trees per acre). Mature stand condition is generally poor, with high density of low vigor trees and a high susceptibility to insects, disease, and fire. Natural events and human activities have substantially altered stand structure and composition.

During the late 1970s and 1980s a severe mountain pine beetle epidemic occurred over vast acreage of the lodgepole pine forests in central and southern Oregon. The La Pine area is at the northern end of this affected area. Stand structure was drastically altered due to the beetle epidemic. In most of the mature stands, beetle-caused mortality of the overstory (trees 8 inches DBH and larger) ranged from 30-80 percent. High mortality has thinned the overstory, creating many openings and allowing the development of dense patches of seedlings and saplings. Most of the dead trees have fallen to the forest floor and are in varying stages of decay. A small percentage (5-10 percent) of the dead trees from this beetle epidemic are still standing but are expected to all be down within another 5-10 years.

Approximately 68 percent (27,291 acres) of the BLM-administered lands in the La Pine area have been harvested in the last 20 years, primarily with seed tree, shelterwood, or commercial thinning methods (see Map S-34: Historic Timber Sales). Machine piling and burning were often associated treatments. Commercial and public firewood harvest has removed most of the dead and down trees within 100 feet of roads. The primary objective for the treatments was to alleviate the extreme fire hazard created with the beetle epidemic. Other objectives were to salvage dead and dying trees and regenerate new stands. These harvested areas are now in varying stages of natural regeneration, ranging from a low density of remnant trees or seedlings to densely reforested with saplings 10-12 feet tall. Prior to the beetle treatments of the last 20 years, earlier harvests occurred over nearly the entire La Pine area from the 1950s to the 1970s. These logging entries were generally low-intensity salvage or single-tree selection harvest of larger diameter ponderosa and lodgepole pine.

Insects and disease continue to impact the mature lodgepole stands. Endemic levels of mountain pine beetle are still present in these stands, killing an occasional tree or small group of trees. Timber harvest and pre-commercial thinning treatments have substantially reduced the risk of another major beetle epidemic in the short-term. However, as the remaining smaller trees and new seedlings grow and stand density increases over the next 20 to 50 years, conditions could once again support another major beetle epidemic. Severe infestations of dwarf mistletoe and western gall rust are also common. These diseases generally do not kill trees directly but can have a significant effect on tree vigor and growth. These diseases typically weaken the trees and make them more susceptible to attack by insects or other fungal diseases. Wind and snow breakage of disease-weakened tree boles and branches is common throughout the mature lodgepole stands.

Prior to European settlement, fire occurred in natural lodgepole pine stands every 20 to 100 years. The La Pine basin tends to experience a longer, drier fire season than higher elevation lodgepole stands, and a shorter fire return interval. These periodic natural fires varied in intensity, sometimes thinning small trees and undergrowth, sometimes destroying entire stands. Thinning by light ground fires allowed surviving trees to grow larger. More extensive fire mortality allowed for new regeneration of entire stands. Natural fire also maintained a higher percentage of the more fire resistant ponderosa pine on some sites. The effect across the landscape was the development of a variety of vegetative types of different composition, structure, ages, sizes, and shapes. Understory plants were burned off allowing for the rejuvenation of bitterbrush, bunchgrasses, and forbs. Fires would also burn through meadows, killing encroaching tree seedlings and maintaining the extent and integrity of meadow plant communities within the lodgepole pine forest.

In the last century, public agency fire prevention and suppression policies decreased fire's influence on the ecosystem. In the absence of periodic fires, lodgepole pine, ponderosa pine, and meadow communities have changed from the composition expected under a natural fire regime. These plant communities have evolved with fire and depend on periodic natural fires for maintenance and regeneration. Consequently, lodgepole pine stands have developed into an over-mature and overly dense condition. Insects and diseases have increased and tree health and vigor have declined. Forb and grass species have declined in diversity and density. Bitterbrush density has increased and plants have become old and decadent. Meadows have declined in size and species diversity. This trend in plant community and structural changes is likely to continue in the absence of natural fire.

The residual dead and down trees, dense "doghair" lodgepole regeneration, and dense and decadent bitterbrush combine to present a high fuel loading and ladder fuels that pose a serious threat of wildfire in portions of the La Pine area. The situation is exacerbated by the rapid population growth and development in the La Pine area, which has pushed residential areas deeper into the forest. Treatments within the last five years have focused on creating fire protection zones of up to one-quarter mile adjacent to several residential subdivisions. Although extensive salvage, thinning, and fuels treatments in the last 20 years have reduced ladder fuels on 68 percent of the La Pine area, there are still several areas of concern near homes and highways. Map S-36, Fire History, shows the remaining high risk zones in the La Pine area.

Ponderosa Pine

Ponderosa pine occurs in small stands and as scattered individual trees in both the northern and La Pine portions of the planning area. Because the La Pine and northern planning area sites are so different ecologically, the discussion of ponderosa pine for the two areas will be separated.

Approximately 8 percent (3,211 acres) of the BLM administered lands in the La Pine portion of the planning is area covered with ponderosa pine or mixed ponderosa/ lodgepole stands in which the ponderosa comprises at least 25 percent of the overstory. Ponderosa pine is particularly evident where there is any hill or slight rise in topography to provide cold air drainage. The largest stands of ponderosa or ponderosa/lodgepole pine mix occur in the vicinity of La Pine State Park, adjacent to Paulina Prairie, northeast of Maston Butte, and west of Wagon Trail Ranch Subdivision. Ponderosa pine also occurs as individual trees widely scattered throughout much of the lodgepole pine type. Understory species are similar to those as described under the Lodgepole Pine subsection.

Ponderosa pine stands in the La Pine area generally have a multi-layered structure with a variety of size and age classes from seedlings to large, mature trees. Dense lodgepole and ponderosa pine reproduction is common in the understory. Historically, there were greater numbers of large diameter ponderosa pine in the La Pine area. Past selective logging, intense stand competition, and mortality by western pine beetle reduced the numbers of these large trees.

Occurrence of insects and disease is far less common in ponderosa pine compared to lodgepole pine. Western pine beetle kills individual large ponderosa, especially those weakened by stresses such as competition, drought, lightning strikes, or disease. Light infections of gall rust and mistletoe occur in the ponderosa pine. A Pandora moth outbreak in the 1990s defoliated and weakened but did not kill most of the ponderosa pine on the north end of the La Pine area.

Commercial timber operations in the last 20 years harvested very few ponderosa pine trees. Salvage and thinning treatments within ponderosa pine stands focused on removing dead and diseased lodgepole pine and leaving the healthier ponderosa pine.

The northern planning area has ponderosa pine on approximately 3 percent (1,800 acres) of that area, often mixed with juniper. The Tumalo area, Squaw Creek, Fremont Canyon, and the forest fringe just east of the Bend-Fort Rock District, Deschutes National Forest contain most of the ponderosa pine in this area. These dry-site pine stands represent the easternmost extension of the east slope Cascade ponderosa pine forest. Ponderosa pine also occurs as individual trees or in small groups on Powell Buttes, West Butte, Bear Creek Buttes, Crooked River Canyon, and various other north slope and canyon bottom micro-sites where sufficient soil moisture exists. In some of these dry marginal sites, ponderosa pine is expanding into rangeland areas. Grizzly Mountain also has some Douglas-fir mixed with pine on the north and northeast slopes.

These small ponderosa pine stands typically contain a few scattered large diameter trees (20-30 inches DBH) with a mix of seedlings, saplings, and pole-sized trees in the understory. Small pockets of dense ponderosa pine reproduction occur in the stands on the west side of the planning area. There are endemic levels of insects and root disease causing light mortality in individual trees or small groups.

Understory vegetation is similar to that found in the juniper woodlands just to the east. Antelope bitterbrush dominates the shrub layer and is often co-dominant with big sagebrush or gray rabbitbrush, depending on the site. Squaw or golden currant is often present. Idaho fescue or squirreltail dominate the grass layer. Bluebunch wheatgrass is often present but is not as dominant as in the western juniper. Junegrass can be dominant in some of these pine sites.

Ponderosa stands in the northern area had very little harvest activity in the last 20 years. Most of these pine sites were entered at least once within the last 30-50 years, primarily for selective and salvage harvests of larger diameter trees. Selective harvest and stress-induced mortality of mature ponderosa pine has left few areas with late successional

or old-growth forest characteristics. These areas serve an important ecological role and provide habitat for a variety of old growth-dependent wildlife species. The occurrence, distribution, and connectivity of this type of forest community is below historic ranges.

Natural fire played a very important role in maintaining the ecological integrity of ponderosa pine stands in the planning area. Fire intervals on these sites were 4-24 years (Agee, 1993). Because fires occurred frequently, they tended to be low-intensity ground fires. These periodic ground fires usually burned in a mosaic pattern and consumed duff, needles, broken branches, shrubs, and small trees. Grasses and forbs were maintained in a denser, more vigorous, more diverse condition. Thin-barked juniper and lodgepole pine were periodically thinned by fire and kept in a subordinate position. The result was a nearly pure ponderosa pine stand with an open, one or two layer canopy, low density, and large diameter tree structure.

Fire suppression, beginning in the early 1900s, substantially altered ponderosa pine stand structure. An absence of fire allowed seedlings and saplings of ponderosa pine, lodgepole pine or juniper to establish underneath the larger trees. Current stand structure is now multiple canopy with many more trees per acre at a much smaller average diameter. Lodgepole pine or juniper are gaining dominance. Larger ponderosa pine are showing stress and mortality from understory competition and from drought conditions. Bitterbrush has become dense and stagnant with a high ratio of dead to live branches. Grass and forb density and diversity have decreased.

Riparian and Wetland Communities

Because of their proximity to water, the plant species present in riparian areas often differ considerably from species found in the adjacent uplands. The riparian areas within the planning area represent only a small percentage of the total planning area, but are important for the overall health of a system. A functioning riparian zone provides fish and wildlife habitat, protects water quality, stabilizes stream banks, aids groundwater recharge, assists in flood control, and provides visual esthetics and recreational opportunities. Poor upland vegetation or watershed conditions can disrupt riparian functioning. Noxious weeds and western juniper often occupy streamside and other riparian areas in the planning area. These plants have displaced native species in some areas, affecting riparian functioning.

Wet meadows are unique riparian habitat. They occur on areas of saturated soils where the water table varies little by season. Usually there are few, if any, areas of free standing open water. The vegetation of wet meadows consists of sedges, grasses, and forbs. Shrubs are limited in wet meadows that are in PFC (see Water section) and generally occur along the margins.

Ponds and stock reservoirs may be perennial or seasonal in nature, such as ponds fed by spring snowmelt (see Water section). Ponds or reservoirs that contain water year round generally support riparian type vegetation such as sedges, rushes, cattails, and occasionally willow. Vegetation surrounding seasonal ponds or reservoirs usually consists of upland type shrubs and/or grasses, or may not be present at all.

Within the Crooked River Canyon located downstream from Bowman Dam (Chimney Rock segment of the Lower Crooked River WSR), the riparian community type is characterized by willow, sedges, rushes, and grasses. Other shrubs, including red-osier dogwood and mock-orange, can also be found (BLM and BOR, 1992). Downstream from the Lower Crooked WSR segment, the valley bottom widens and the riparian community type is characterized more by herbaceous vegetation such as grass, sedges and rushes, and less so by shrubs and trees.

Approaching the Lower Crooked River WSR segment near Smith Rock State Park, the

river becomes increasingly confined, generally flowing through a deep, narrow canyon. The same holds true for the Middle Deschutes River downstream from the city of Bend. The riparian zone in both canyons is narrow and dominated by woody species including alder, red-osier dogwood, willow, chokecherry, rose, clematis, sedge, rush, and various grasses. There are very few broad areas containing extensive willow or sedge/rush communities. Increasingly, talus and boulders are piled onto the banks and even into the river. Often woody and emergent riparian vegetation grows between boulders. Occasionally the canyon walls recede somewhat and the flood plain widens allowing for a wider riparian zone and adjacent grassy terraces. Within the canyons a number of springs emerge from the canyon walls where there is an increase in riparian vegetation including areas of emergent and sedge/rush communities. These riparian zones associated with springs are relatively small in area, usually less than a few acres in size.

The Upper Deschutes River WSR segment is characterized by stands of lodgepole pine and ponderosa pine as an overstory; a shrub understory of spiraea, snowberry, alder, or willow, and an herbaceous layer of forbs and sedges. There are several large willow/sedge meadows scattered within the reaches (USFS, 1996).

The Little Deschutes River contains a complex mosaic of riparian habitats on broad flood plains, including broad meadow and prairie areas composed primarily of sedge, rush, and/or grass communities with scattered willows and other woody riparian species. Most of these meadows are drained and irrigated with water from the Little Deschutes River or one of its tributaries. Where these meadows are drained and irrigated, they tend to be dominated more by grass species with sedge/rush communities along the ditches and occasional willow communities. Adjacent to the Little Deschutes River and its oxbows, there are dense willow communities interspersed with wet meadows encompassing a wide variety of emergent and flood tolerant species of vegetation.

Wet meadow, forested wetlands, and shrub wetlands habitat is very limited, much of it is not yet mapped electronically (see Water section). Most of the wetland type vegetation is associated with the high groundwater table in the La Pine area. Sedges, rushes and willows are dominant species within wet meadows adjacent to the Little Deschutes River, and lodgepole pine inhabits forested wetlands.

Large floods typically reset riparian vegetation to early seral species, or set back the condition and amount of late seral species. These flood events generally occur during late winter or early spring. Large floods periodically occur in Bear, Sanford, and other creeks in the Crooked River watershed. The magnitude and frequency of flood events on the Crooked River below Bowman Dam has been reduced since the closure of the dam in 1960. Prior to the closure of Bowman Dam in 1960, average peak discharges typically ranged from 3,000-7,000 cfs. Following closure, peaks never exceed approximately 3,300 cfs. This limits the ability of the stream to rejuvenate during the landform developing process of large floods. Peak flows that used to occur on average once every 1.5 years (i.e., 2,200 cfs, approximately bankfull flow) now occur half as often, or about once every three years (See Figure 3-3, Flow Duration Curves Crooked River below Bowman Dam, in the Water Quality and Quantity section of this chapter). This reduced frequency of what was once bankfull flow likely has a significant effect on channel morphology and the resulting riparian vegetation type and composition. Likewise, stream-flows on the Deschutes River have been altered since 1922 by Crane Prairie Reservoir and since 1942 by Wickiup Reservoir.

The various hardwood trees and shrubs associated with riparian areas in several perennial streams and canyons in the planning area provide important habitat for wildlife, fish, stream ecology, and water quality. Examples of these species include alder, willow, chokecherry, serviceberry, red osier dogwood, bog birch, oceanspray, mock-range, currant, snowberry, wild rose, spirea, and aspen. Aspen occurs in only two known locations in the planning area, south of Grizzly Mountain and east of La Pine.

The bio-diversity provided by hardwoods, particularly valuable on xeric landscapes, is being reduced in the planning area by various activities such as fire exclusion, improper grazing and intensive riverside recreation.

Fire is probably relatively infrequent in the meadow and streamside habitats occupied by riparian species within the planning area. In fact, riparian areas frequently act as fire breaks. The high soil and fuel moisture content characteristic of streamside habitat reduces the chance of fire ignition and spread. However, under dry conditions, riparian habitats can burn severely (Crane, 1982). Many riparian species are fire tolerant and may even benefit from low to moderate intensity fires. Most willows in all stages of vigor resprout from the root crown or stem base following fire (Haeussler & Coates, 1986; Lotan, *et al.*, 1981; Rowe & Scotter, 1973; Zasada, 1986) and their numerous wind dispersed seeds are important in revegetating areas following fire (Miller & Miller, 1976). Sedges and rushes also can survive fire by sprouting from their extensive rhizomes (Boggs, *et al*., 1990; Wakimoto & Willard, 1991). Golden and gooseberry currant regeneration is probably favored by low- to moderate-severity fire because germination of soil-stored seed is generally enhanced by scarification in Ribes spp. (Agee & Maruoka, 1994; Bradley, *et al*., 1991; Moss & Wellner, 1953; Steele & Geier-Hayes, 1993; Steele & Geier-Hayes, 1989). Plants in the rose family, as well as serviceberry, chokecherry, bitter cherry, and red osier dogwood are all moderately fire tolerant and are usually favored by low-severity fire. They can persist after low- to moderate-severity fire because of their ability to sprout from undamaged and/or buried root crowns and rhizomes (Boggs, *et al.*, 1990; Haeussler, *et al.*, 1990). Black cottonwood and white alder are not considered fire tolerant and are highly susceptible to fire damage.

Special Status Plants

The policy of BLM is to 1) conserve listed species and the ecosystems on which they depend, and 2) ensure that actions authorized or carried out by BLM are consistent with the needs of special status species and do not contribute to the need to list any of these species. The BLM's policy is intended to assure the survival of those plants that are rare or uncommon, either because they are restricted to specific, uncommon habitat or because they may be in jeopardy due to human-caused or other actions.

Apart from law or policy, three main reasons stand out for conservation of special status species. First, each occupies a niche and has a role in its ecosystem, although we do not always know what that role is. All parts of the system are inter-related and important, even if we don't yet understand the connections. Biological diversity and ecosystem integrity are important for the economic and social, as well as the ecological environment. Second, plants offer untold potential for human benefit, especially as related to pharmaceuticals as nearly all pharmaceuticals were originally plant-based. Loss of a species may mean the loss of a future "wonder drug" or other genetic material valuable for enhancing human lives. Finally, these species add aesthetic diversity to our world.

For BLM, "Special Status" plants include those species that are proposed for listing, officially listed as threatened or endangered, or are candidates for listing under the provisions of the Endangered Species Act (ESA); those listed by a State in a category such as threatened or endangered, implying potential endangerment or extinction; and those designated by each BLM State Director as sensitive (BLM, 2001).

In Oregon, the BLM designation "sensitive" further includes two sub-categories: "Bureau Sensitive" and "Assessment Species." Bureau Sensitive species include those plant species formerly designated by the U.S. Fish and Wildlife Service (USFWS) as Category 1 and 2 candidates for listing as endangered or threatened under the Endangered Species Act and now termed "Species of Concern." This category also includes species considered by the Oregon Natural Heritage Program (ONHP) to be "endangered or

threatened throughout their range." Assessment species include those species considered by ONHP to be "endangered or threatened in Oregon but more common elsewhere" (List 2).

No species either listed, proposed for listing or candidates for listing under the ESA are known from or suspected on BLM-administered lands in the planning area. However, for those State-listed species and sensitive species, existing factors such as declining populations, reduction in habitat, increased disturbances, small and widely dispersed populations and unique habitat requirements contribute to a need for increased management attention to these species to ensure they do not need to be listed under the ESA.

Special status plants receive priority attention for inventory, research, monitoring and management. All proposed ground disturbing activities are subject to botanical inventory prior to implementation and other inventory is accomplished as time and funding allows. All special status plant populations are monitored on a regular schedule with the intervals between visits based on the needs of each. Challenge cost share agreements between the Oregon Department of Agriculture (ODA) and The Nature Conservancy (TNC) have, and continue to provide in-depth monitoring for several species in the District.

All Bureau-authorized actions are reviewed to ensure they do not contribute to the need to list any special status species. This may include modification or abandonment of the proposed action with consideration for protection of the species' habitat as well as the species itself.

Four special status plants are known to occur on BLM-managed lands within the planning area, as shown in Table 3-6, below.

Peck's milkvetch is predominately found in the area southwest of Cline Buttes, between Tumalo and Plainview. Preferred habitat is open sandy soil dominated by western juniper and sagebrush, usually with a flat aspect. Sandy basins are especially preferred. While the Cline Buttes area is the area with this plant's greatest concentration, several populations have been found on Forest Service and private land south of the planning area in pumice soils dominated by lodgepole pine, with one population located on public land at the extreme south end of the planning area.

The block of BLM-administered land south of Plainview was designated as Peck's Milkvetch Area of Critical Environmental Concern (ACEC) in 1986 (see Map 7: Special

Table 3-6. Special Status Plants within the Upper Deschutes Planning Area

Latin Name	Common Name	Status[1]	Ownership
Astragalus pekii	Peck's Milkvetch	BS, SOC, T, 1	BLM, USFS, pvt.
Artemisia estesii ssp. pekii	Estes' Wormwood	BS, SOC, 1	BLM, USFS, pvt.
Botrychium pumicola	pumice grapefern	BS, SOC, T, 1	BLM, USFS, pvt.
Castilleja chlorotica	green-tinged paintbrush	BS, SOC, 1	BLM, USFS, pvt.

[1]BS – Bureau Sensitive

SOC – Species of Concern

T – Listed Threatened by the State of Oregon

1 – OHNP List 1, Endangered or Threatened throughout its range

Management Areas). Since 1986, the ACEC has been intensively inventoried for the species and ongoing inventory has extended the plant's known range northeast toward Cline Buttes.

The greatest concern for Peck's milkvetch is the loss of habitat as suitable habitat on private land is developed. Habitat loss is expected to increase proportionate to the number of people living in and adjacent to the planning area. On public land, any activities that cause long-term trampling of the plants and/or soil disturbance are cause for concern as these actions will reduce the plant's vigor and ability to reproduce. This includes, but is not limited to, improper livestock grazing and recreation, but especially unauthorized vehicle use away from established routes and illegal activities such as dumping and firewood theft. Peck's milkvetch has been observed to establish on disturbed sites but only if the disturbance is short-lived and not ongoing. Both recreational impacts and impacts resulting from unauthorized activities are expected to increase along with the human population of Deschutes County. Fire, as a natural component of the ecosystem, is not considered to be detrimental to the plant. Some vigorous Peck's milkvetch populations have been found in areas which have clearly burned within recent history.

On BLM-administered land within the planning area, Peck's milkvetch appears to be stable. A long-term monitoring study, in cooperation with The Nature Conservancy, was established in 1992, and data collected again in 1993, 1994 and 2000. Based on statistical analysis of the data, it appears Peck's milkvetch increased after 1992 (a dry year) but that some populations may be returning to 1992 levels. Further monitoring will be necessary to determine the trends of these populations (Rudd, 2001).

Estes' wormwood is a perennial, herbaceous relative of big sagebrush. Its primary known habitat is sandy and gravelly soils along the Deschutes River, from near La Pine in the south to Lake Billy Chinook in the north. Additionally, an old collection of Estes' wormwood has been documented as coming from Bear Creek. While this population has not been relocated, recent inventory has found the species in the Prineville Reservoir area and at two locations along the Lower Crooked River, one just below Bowman Dam and from the area just south of Lake Billy Chinook. It is likely that other populations occur elsewhere along the Crooked River.

Estes' wormwood is affected by livestock and wildlife grazing, streamside recreation, and any activity that degrades the riparian areas along the Crooked and Deschutes Rivers. Direct impacts on the plants would result in a loss of vigor and reproductive capability, while a change in species composition of the riparian community could result in a drying of the site and a loss of appropriate habitat. Equally important, would be upstream pollution or a widely-fluctuating flow regime. As a clonal species, it is likely fire would have no effect. As the population of Central Oregon increases, it is probable that visitor use in the riparian areas along both the Crooked and Deschutes Rivers will increase as well. This would likely result in continued disturbance and alteration of Estes' wormwood habitat. Due to the relative inaccessibility of much of its habitat and the reduced amount of grazing that occurs in the canyons, Estes' wormwood appears to be stable, but there are no quantitative studies to substantiate this.

Pumice grapefern generally has a distribution from near Crater Lake to the Deschutes National Forest northeast of La Pine. Originally thought to be found only on high elevation pumice flats, more recent inventory has documented extensive occurrences in the lodgepole pine forest of the La Pine Basin and to the northeast. It grows exclusively on deep pumice soils associated with the Newberry and Mt. Mazama ash deposits and, on BLM-managed land, is found mostly south and east of La Pine.

Pumice grapefern in the planning area has been impacted through habitat change. An increased lodgepole pine canopy, as a result of fire suppression, coupled with an

abundance of dead and down trees from the recent outbreak of the mountain pine beetle, has resulted in an extremely heavy litter component in much of the La Pine Basin. While the shading resulting from the dense canopy and heavy litter concentration is most likely detrimental to the pumice grapefern, another concern relates to the potential of catastrophic fire as a result of these conditions. The pumice grapefern, no doubt, existed within a natural fire regime in the La Pine Basin, but the existing fuel loading and potentially extreme burning conditions would probably be detrimental should fire occur.

As a relatively fragile species (a fleshy plant growing in easily dislodged soils), pumice grapefern is also easily damaged by logging machinery, off-road vehicle use, and livestock grazing (trampling), although grazing isn't a major factor within its range. Although plants have been found in areas subjected to such activities, it does not appear that this is a preferred habitat, as plant densities appear to be substantially less than in undisturbed areas.

The long-term trend of pumice grapefern is unknown. It is likely that populations have declined due to an increase in the lodgepole pine overstory, but now that many of these areas have been harvested and the woody material removed, these populations could be recovering. Issues related to predation of some populations by animals, inconsistent emergence in the spring and the unknown influence of weather make this a difficult species to monitor with any consistency and, therefore, it is difficult to infer trend. The BLM is a partner in funding a project designed to determine the effects of various types of disturbance on pumice grapefern. Results should be available in 2005.

Green-tinged paintbrush in the Prineville District is at the northeastern edge of its range, and within the planning area, is known from the Horse Ridge, Golden Basin, and West Butte and Bear Creek Buttes areas. Requiring a fungal interface with shrubs, it is found most often associated with big sagebrush but also with pronghorn bitterbrush in ponderosa pine or lodgepole pine communities. Green-tinged paintbrush is more common, although still a Species of Concern, on the Deschutes and Fremont National Forests.

Identified disturbances to green-tinged paintbrush include livestock grazing, off-road vehicle use and fire. Observations indicate that green-tinged paintbrush is preferred by livestock, and in areas where livestock use is heavy during the growing season, heavy utilization of green-tinged paintbrush has been noted. OHV use is a concern since several known populations occur within or adjacent to areas used by OHV enthusiasts.

While fire may enhance most native plant communities, survival of mature big sagebrush and bitterbrush, neither of which are fire resistant, is critical for survival of green-tinged paintbrush. Green-tinged paintbrush has been effectively extirpated from burned areas, although plants survive adjacent to these areas and can likely repopulate in time. No data exists, but it appears that green-tinged paintbrush is stable within the planning area.

Noxious Weeds

There are many exotic (non-native) plant species that occur within the planning area. Most of these aggressive species have been introduced, usually from Europe, Asia, or Russia. These species were imported, either intentionally for their perceived value to humans, or inadvertently as contaminants in feed or other seed or plant products.

The term "weeds" is loosely applied to most of these introduced species. A weed is defined as any plant that interferes with the management objectives for a given area of land at a given point in time (Dewey and Torell 1991). Of the exotic species in the planning area, 12 have been classified by the counties and State as noxious weeds. "Noxious" is a legal classification rather than an ecological term. Government agencies may designate a species a "noxious weed" if it directly or indirectly imposes economic or

ecological effects to agriculture, navigation, fish and wildlife, or public health. Federal, state and county laws and ordinances require that certain actions be taken to manage listed noxious weed species.

Noxious weeds pose a threat to native biological systems and degrade all multiple-uses and other values on BLM administered lands. These plants use water, nutrients, and sunlight that would otherwise be used by native species, thus altering natural communities and ecosystems. The invasiveness of weeds is due to their genetic make-up, which enables them to exploit a resource "niche," and the lack of natural enemies such as insects, diseases, and pathogens (Story, 1992). Some of the consequences of noxious weeds on BLM administered lands include effects on: productivity of native rangelands; diversity of native plant and animal species; range and population of special status plants; habitat structural diversity; soil biological crusts; scenic values; tourism; recreation; and in some cases, human health and safety. Noxious weeds degrade these uses and values by displacing native plant species, decreasing soil stability, and disrupting natural processes such as soil/water interactions, fire frequency and intensity, nutrient cycling, and energy flow.

Noxious weed species are well-established and spreading rapidly in the planning area. The spread of noxious weeds has been considered analogous to a biological wildfire. The local expansion of noxious weeds is part of a trend involving all of the other western states. Almost all the listed species in Central Oregon have expanded in both area and numbers of populations in the last 10 years. Weed seed is carried and spread by livestock, wildlife, wind, water, and people and their vehicles. Spread of weeds on BLM administered lands is particularly apparent where surface soils or native vegetation are disturbed. Some of the disturbance factors on BLM-administered lands are off-road vehicle travel, livestock grazing, logging, military training exercises, and construction of roads and utility lines. A majority of infestations occur adjacent to roads, powerlines, ditches, and canals; indicating that the primary carriers of weed seed are vehicles and water. Ground-based activities, particularly those involving motor vehicles or equipment, disturb surface soils which has the effect of preparing a receptive seed bed for these pioneering species.

Noxious weed management within the planning area is currently in conformance with "Vegetation Treatment on BLM lands in Thirteen Western States" (1991) and the Prineville District Integrated Weed Management EA OR-053-3-062 (1994). These plans prescribe an integrated approach involving prevention, early detection, inventory, timely control (using biological, mechanical, manual, and chemical techniques), monitoring, and site rehabilitation. The selection of control methods is influenced by land management objectives, effectiveness of the control technique on the target species, size of the infestation, environmental concerns, land uses, and economics. BLM cooperates with county, state, and other federal agencies that have jurisdiction in or near the planning area.

Following is a brief description of the most important noxious weed species found in the planning area:

Spotted and Diffuse Knapweed: Spotted and diffuse knapweed are widespread, with the Bend area having the largest infestation of spotted knapweed in the state. Spotted knapweed is expanding in all directions. Diffuse knapweed is more plentiful in the northern and eastern portions of the planning area. Both produce an abundance of seed that is easily spread.

Russian Knapweed: Russian knapweed is found in patches and is more common in Crook County along riparian areas and agricultural fields. This is a deep-rooted perennial that spreads relatively slowly. It is more resistant to control methods and has no established biological control agents in Oregon.

Hoary Cress: Hoary cress invades irrigated fields and riparian areas; it is most common in Crook County. It is a deep-rooted perennial. There are no biological control agents available for this species.

Leafy Spurge: Leafy spurge grows primarily in Crook County in the riparian areas of Mill Creek and the Crooked River. It also is present in the adjacent riparian areas of canals, ditches and irrigated fields. Its close proximity to water makes for difficult control.

Dalmatian Toadflax: Dalmatian toadflax is common in the Bend and Redmond areas and is expanding in all directions. Due to its very pretty yellow snapdragon-like flower, this noxious weed is often spread inadvertently by homeowners who cultivate it in flowerbeds.

Poison Hemlock: Poison hemlock is very poisonous to both humans and livestock if eaten. It is found in wet areas along rivers and irrigation ditches in the area. It poses a public health risk where it occurs in or near recreation areas.

Perennial Pepperweed: Perennial pepperweed is deep rooted and inhabits riparian areas and wet areas along canals, ditches and irrigated fields. The largest infestation in the planning area is at the upper end of Prineville Reservoir.

Scotch Thistle: Scotch thistle can take over large areas and render land useless for most activities. Scotch thistle, mostly a biannual, grows to 6 to 8 feet tall.

Medusahead: Medusahead is a very invasive annual grass that will replace most other native range plants. This species can dominate silty or clay soil types. It develops a silica mat of vegetation and can present an extreme fire hazard.

Yellow-Star Thistle: Yellow-star thistle is an annual that quickly dominates a site by massive growth of plants from seeds after any small amount of rain. Bees are attracted to it as it blooms all summer long. Very stiff spines around flower discourage people use in area of dominance.

Puncture Vine: Puncture Vine is a common annual in Crook and Jefferson Counties. It has spiny seed pods that cause grief for bike riders, dogs and bare-footed pedestrians.

In addition to the agency-listed noxious weed species, there are other common non-native species that are causing varying degrees of impacts to public land resources. These species include cheatgrass, tumbleweed, ragweed, and various thistles and mustards. Cheatgrass, although not listed as a noxious weed, is very prevalent in the planning area and is damaging to native landscapes. This annual was introduced from Asia. It can out-compete native grasses by its ability to germinate in the fall and early spring, by its aggressive establishment after fire or other ground disturbance, and by its production of abundant and persistent seed.

Wildlife and Fish

This section describes the current habitat conditions and unique features of the landscape that provide for wildlife species throughout their life cycles. As previously described in the vegetation section, the planning area is characterized by several major distinct vegetative community types. These major vegetative community types along with non-vegetative habitats such as caves, cliffs, and water provide a set of conditions, structure, scale, and disturbances that affect the diversity and abundance of the wildlife associated with each habitat type.

This document focuses on priority wildlife species, which includes both non-special-status species and special status species. These priority wildlife species are called "Species of Focus" and are listed in Table 3-7, Species of Focus[1].

[1] *Species of focus* are vertebrate species for which there is ongoing concern about population or habitat status. We used four criteria to develop the list of species that were the focus of our planning and assessment. For this planning effort species were included if they met any of the following:
- Species that are included in the Special Status Species Policy (6840) which includes: federally listed threatened, endangered, proposed or candidate species; Bureau Sensitive, Assessment, or Tracking Species; and State listed species.
- Species of local interest, such as deer, elk, pronghorn and golden eagles.

Table 3-7. Species of Focus[2]

Common Name	Scientific Name	Assessment type: Single–species or Source Habitat (Multi–species[3])
	Federally Listed Species (Threatened)	
Northern Bald Eagle	*Haliaeetus leucocephalus*	Single Species
	Federal Candidate Species	
Columbia Spotted Frog**	*Rana luteiventris*	Source Habitat: Riparian
Oregon Spotted Frog	*Rana pretiosa*	Source Habitat: Riparian
	Bureau Sensitive Species	
AMPHIBIANS AND REPTILES – None		
BIRDS		
American Peregrine Falcon**	*Falco peregrinus anatum*	Source Habitat: Riparian
Black-backed Woodpecker	*Picoides arcticus*	Source Habitat: Ponderosa Pine/Lodgepole Pine
Burrowing Owl	*Athene cunicularia*	Source Habitat: Shrub – Steppe
Ferruginous Hawk	*Buteo regalis*	Source Habitat: Shrub – Steppe
Flammulated Owl	*Otus Flammeolus*	Source Habitat: Ponderosa Pine/Lodgepole Pine
Lewis's Woodpecker**	*Melanerpes lewis*	Source Habitat: Ponderosa Pine/Lodgepole Pine
Northern Goshawk	*Accipiter gentilis*	Source Habitat: Ponderosa Pine/Lodgepole Pine
Northern Pygmy owl	*Glaucidium gnoma*	Source Habitat: Ponderosa Pine/Lodgepole Pine
Northern Three-toed Woodpecker	*Picoides tridactylus*	Source Habitat: Ponderosa Pine/Lodgepole Pine
Pygmy Nuthatch (BM)	*Sitta pygmaea*	Source Habitat: Ponderosa Pine/Lodgepole Pine
Upland Sandpiper	*Bartramia longicauda*	Source Habitat: Riparian, grassland
Western Sage Grouse	*Centrocercus urophasianus phaios*	Single Species
White-headed Woodpecker**	*Picoides albolarvatus*	Source Habitat: Ponderosa Pine/Lodgepole Pine
MAMMALS		
Fisher	*Martes pennanti*	Source Habitat: Riparian
Townsend's Big-eared Bat	*Corynorhinus townsendii*	Single Species
	Bureau Assessment Species	
AMPHIPIANS AND REPTILES – None		
BIRDS		
Black-throated Sparrow	*Amphispiza bilineata*	Source Habitat: Shrub-Steppe
Northern Water Thrush**	*Seiurus noveboracensis*	Source Habitat: Riparian
Tricolored Blackbird**	*Agelaius tricolor*	Source Habitat: Riparian
MAMMALS		
Pygmy Rabbit	*Backylagus idahoensis*	Source Habitat: Shrub-Steppe
Brazilian Free-tailed Bat	*Tadarida brasiliensis*	Source Habitat: All - general
Spotted Bat**	*Euderma maculatum*	Source Habitat: Shrub-Steppe, forest/woodland, Riparian
	Bureau Tracking Species	
AMPHIBIANS AND REPTILES		
Cascade Frog	*Rana cascadae*	Source Habitat: Shrub-Steppe
Northern Sagebrush Lizard	*Sceloporus grasiosus graciosus*	Source Habitat: Shrub-Steppe
Western Toad	*Bufo Boreas*	Source Habitats: All General
BIRDS		
Bank Swallow	*Riparia riparia*	Source Habitat: Riparian, Shrub-Steppe
Great Gray Owl	*Strix nebulosa*	Source Habitat: Ponderosa Pine/Lodgepole Pine forest
Greater Sandhill Crane**	*Grus Canadensis tabida*	Source Habitat: Riparian
Loggerhead Shrike**	*Lanius ludocicianus*	Source Habitat: Shrub-Steppe, Juniper Woodland
Long-billed Curlew**	*Numenius americanus*	Source Habitat: Shrub-Steppe, Riparian

Mountain Quail	Oreortyx pictus	Source Habitat: Ponderosa Pine/Lodgepole Pine
Olive-sided Flycatcher	Contopus borealis	Source Habitat: Ponderosa Pine/Lodgepole Pine
Pileated Woodpecker	Cryocopus pileatus	Source Habitat: Ponderosa Pine/Lodgepole Pine
Pine Grosbeak	Pinicola enucleator	Source Habitat: Ponderosa Pine/Lodgepole Pine
Pygmy Nuthatch (EC, HP)**	Sitta pygmaea	Source Habitat: Ponderosa Pine/Lodgepole Pine
Sage Sparrow	Amphispiza billi	Source Habitat: Shrub-Steppe
Williamson's Sapsucker**	Sphyrapicus throideus	Source Habitat: Ponderosa Pine/Lodgepole Pine
Willow Flycatcher	Empidom hax trailii brewsteri	Source Habitat: Riparian/woodland
MAMMALS		
American Marten	Martes Americana	Source Habitat: Ponderosa Pine/Lodgepole Pine forest
Bighorn Sheep	Ovis canadensis	
Long-eared myotis**	Myotis evotis	Source Habitat: Forest, Shrub-Steppe, Woodland, Riparian
Long-legged myotis**	Myotis volans	Source Habitat: Forest, Shrub-Steppe, Woodland, Riparian
Pallid Bat**	Antozous pallidus	Source Habitat: All - General
Preble's Shrew**	Sorex Preblei	Source Habitat: Shrub-Steppe, Riparian
Silver-haired bat**	Lasionycteris noctivagans	Source Habitat: Ponderosa Pine/Lodgepole Pine
Western Gray Squirrel	Sciurus griseus	Source Habitat: Ponderosa Pine Forest
Western Small-footed Myotis**	Myotis ciliolabrum	Source Habitat: Shrub-Steppe, Ponderosa Pine, Juniper
White-tailed Jackrabbit**	Lepus townsendii	Source Habitat: Shrub-Steppe, Ponderosa Pine, Juniper
Yuma Myotis**	Myotis yumanensis	Source Habitat: All General
	Species of Local Interest	
Mule Deer	Odocoileus hemionus	Single-species
Rocky Mountain Elk	Cervus elaphus nelsoni	Single-species
Pronghorn	Antilocapra Americana	Single-species
Golden Eagle	Aquila chrysaetos	Single-species

Table notes: *Documented occurrence in the district does not mean the species has been documented in the planning area.
**Species to consider conducting surveys on to determine population and habitat presence/absence.

[2] Including Special Status Wildlife Species Inhabiting or Potentially Inhabiting the Upper Deschutes Planning Area and Species of Local Interest
[3] For multi-species assessment types the animal's associated source habitat(s) is (are) named.

A list of priority animal species for the Upper Deschutes planning area is listed in the Table 3-7 Species of Focus. These animals will be discussed in four broad categories of birds, mammals, amphibians, and reptiles. In each category, species discussion will be in the order of federally listed Threatened or Endangered species, special status species, and locally important species (those recognized as being of particular interest to the public).

The Bureau of Land Management has a policy for designating special status species that is tiered to state agencies' and Oregon Natural History program designations. Currently, the BLM in Oregon uses three categories for special status species. Special Status Species are those proposed for official listing as threatened or endangered under the provisions of the Endangered Species Act (ESA); those listed by a State in a category such as threatened or endangered of extinction; and those designated by each State Director as sensitive. The Oregon/Washington BLM State Director designated sensitive species under the category "Bureau Sensitive" plus established two additional categories of plant and animal species ("Assessment" and "Tracking"). Brief definitions are as follows: Bureau Sensitive Species are generally restricted in their range and which have natural or human-caused threats to their survival; Bureau Assessment Species are species which are not presently eligible for official federal or state status but are of concern in Oregon; and

Bureau Tracking Species are species which may become threatened or endangered in the future. For a more thorough description of special status species and their management refer to Manual 6840, Special Status Species Management.

Birds

Raptors

Raptors are a group of predatory birds that includes eagles, falcons, hawks and owls. They are a common sight in much of the planning area, and use a wide range of habitats. Many raptors are viewed as species of high public interest. Raptors and their habitats are protected under the Eagle Protection Act (1963), and the Migratory Bird Treaty Act (1918). Raptors that occur or could occur in the planning area include one federally listed species, five BLM sensitive species, and two BLM tracking species.

Much of their life cycle is dedicated to breeding, nesting and raising young. Most raptors require elevated nesting sites and have historically used a variety of nesting platforms on which they construct stick nests. In the planning area nesting occurs on cliff ledges, lava rock out-crops, single large ponderosa trees, lodgepole pine thickets, juniper trees, utility poles, grasslands, wetlands and riparian associated vegetation. Foraging habits differ by species, but most raptors prey on a variety of small mammals, reptiles, birds and insects.

Except for the bald eagle, no systematic inventories have been completed for raptors or their habitats, but many species have been recognized as year-round residents of the planning area. Species present in the planning area include bald and golden eagles, osprey, ferruginous hawk, northern goshawk, Swainson's hawk, red-tailed hawk, Cooper's hawk, sharp-shinned hawk, American kestrel, northern harrier, and prairie falcon. During winter many of these species migrate south to various wintering grounds. Central Oregon serves as a winter area for the rough-legged hawks, which are seasonally abundant throughout the northern portion of the planning area. Owls are year-round residents; however a few species do migrate in winter. Common owls in the planning area include the great horned, great gray, long-eared, short-eared, barn, western screech, and northern saw-whet.

In Oregon the northern bald eagle was federally listed in 1978 as a threatened species under the Endangered Species Act (ESA) of 1973 (as amended CFR, 1988). The eagle was placed in this status as a result of destruction of habitat, harassment and disturbance, shooting, electrocution, poisoning, a declining food base, and environmental contaminants. Recovery efforts during the past two decades have increased the population above the goals of the Pacific Bald Eagle Recovery Plan (USDI 1986).

Bald eagle nesting territories are normally associated with lakes, reservoirs, or rivers. Nests are usually located in large conifers in uneven-aged, multi-storied stands with old-growth components (Anthony *et al.*, 1982). Factors such as tree height, diameter, tree species, and position on the landscape, distance from water, and distance from disturbances also appear to influence nest selection. Additionally, eagles select trees that provide vantage points from which territories can be defended. Bald eagles feed primarily on fish during the spring/ summer but may shift to waterfowl and rodents during fall and winter.

Surveys for and monitoring of nesting bald eagles have been conducted annually since 1979 by the Oregon Cooperative Wildlife Research unit, the Oregon Eagle Foundation (OEF), BLM, and USFS. These surveys have identified three bald eagle nests on BLM-administered land, one on National Forest land, and three on private lands within the planning area. Additionally, four nests have been located on National Forest and private lands within two miles of the planning boundary.

Two of the three nests on public land occur immediately adjacent to major water sources where recreationists could influence eagle occupancy. The other nest site requires the eagles to travel longer distances for foraging, yet have been successful at raising young the past several years (Isaacs survey records, 1991-2001).

The golden eagle is a species of high public interest and is protected under the Bald Eagle Protection Act (1963), and the Migratory Bird Treaty Act (1918). Golden eagles are a year round resident and construct large stick nests mainly on cliffs and sometimes in large conifers. Golden eagles prefer open shrub/grasslands, and open woodlands where they prey on rabbits and hares, marmots, squirrels and other small to medium-sized animals.

Systematic inventories have not been conducted for golden eagles or their habitats, however, nests sites have been found in the planning area on canyon rims (rock ledges), old-growth juniper trees and large single ponderosa pine trees. The BLM Prineville District works with ODFW and volunteers to monitor some of these nests annually. Golden eagles are sensitive to human disturbances during the breeding season and they often nest in areas popular for recreational activities.

The peregrine falcon (Bureau Sensitive) was federally listed as an endangered species throughout its range and as a state endangered species. However, in 1999, the peregrine falcon was de-listed after recovery efforts helped the population achieve the recovery goals set forth in the 1982 Pacific Coast Recovery Plan for the American Peregrine Falcon.

The peregrine falcon is a cliff-nesting species, preferring tall cliffs with ledges, or small caves that are suitable for constructing a nest scrape (USFWS 1982). Nest sites are usually associated with cliffs near water with an abundant population of non-game birds, shorebirds, and waterfowl, the peregrine's primary prey. Raptor surveys conducted throughout Central Oregon have determined that suitable habitats exist, but no nests sites were found. Peregrine falcons can be observed in the planning area during winter migration.

The northern goshawk (Bureau Sensitive) occurs both in the northern planning area and the La Pine block. Goshawks, normally a forest bird, are common in coniferous forests, but will also use aspen groves, desert mountain ranges and dense juniper woodlands. Goshawk nests are usually located in the fork of a tree limb near the trunk of the tree. Diet consists of both birds and small mammals. Surveys have located several nests in the La Pine area. No surveys have been conducted in the northern portion of the planning area, but there are two known nests sites that have been active the past several years.

Prairie falcons are common in the planning area and protected under the Migratory Bird Treaty Act. They typically inhabit arid deserts and open grasslands where they use cliffs for nesting habitat. A cliff is any vertical rock face or structure that may exist as rock spires, vertical scarps, volcanic dikes, or large lava blisters. These falcons are opportunistic feeders that can take small mammals up to the size of jackrabbits but mainly forage small mammals and birds, lizards and grasshoppers.

No systematic inventories have been completed for prairie falcons but several known nest sites are monitored annually. BLM coordinates with ODFW and volunteers to monitor these nests. These nest sites mainly occur on cliff faces in river canyons but there are several known nests in lava blisters, and small rim-rock escarpments.

Little is know about flammulated owls (Bureau Sensitive) in the planning area. Flammulated owls use open conifer forests and appear to prefer ponderosa pine. It requires fairly large trees for roosting that are adjacent to patches of grassland or meadow, where it forages. This owl is mainly an insectivore, preferring grasshoppers and moths, but also eating beetles, crickets, spiders, and occasionally small mammals and

birds. A limited amount of survey has been done in portions of La Pine block with no locations found. No known nesting occurs in the planning area.

Burrowing owls (Bureau Sensitive) historically occurred in the planning area but there have been no sightings in the past several decades. They prefer open grassland habitats where they feed mainly on small mammals and insects.

The northern pygmy owl (Bureau Sensitive) is a small owl that will hunt by day and nests in tree cavities. Like most owls, the Pygmy owl does not create nesting cavities so it depends on woodpeckers, nuthatches and natural decay processes. This owl inhabits moist forest types, riparian woodlands, as well as drier ponderosa pine forests. This species will move to lower elevations during winter and will also make use of juniper and aspen stands. Past forestry practices that removed dead standing and live trees with internal decay have impacted nesting habitat for this species. Current federal land management practices include conservation measures for their nesting habitats.

The major impacts to raptors or their habitat are disturbances near the nest during the nesting season. Disturbances are usually a result of human uses such as mining, OHVs, rock or cliff climbing, equestrian rides, target shooting, boating, and hiking. In general, habitat conditions have remained relatively stable in the planning area, but human uses are increasing near known nesting areas. During the past several years, golden eagles and prairie falcons have changed nesting sites in areas of high recreational use, suggesting that increasing disturbances may effect nest locations and productivity.

Several known nests sites are monitored annually, usually related to areas of high recreational use. BLM coordinates with ODFW and volunteers to monitor these nests and seasonal closures have been put in place to protect these important reproductive habitats.

Upland Birds

A variety of upland birds occur within the planning area, using all of the vegetation types in the area. These birds are hunted for sport and regulated by ODFW. Species that occur in the planning area include native sage grouse, ruffed grouse, valley and mountain quail, and introduced ring-necked pheasant, wild turkey, chukar and gray partridge. Sage grouse and mountain quail are species of concern and will be the only ones from this group covered in detail.

Upland birds are ground nesters and construct nests in a shallow depressions on the ground concealed in thick vegetation of grasses or shrubs. Composition of the diets vary by species but upland birds forage on a variety of plant parts along with insects, such as grasshoppers, beetles and ants. Flowering plants (called forbs) are a main food source and have very high nutritional content.

Throughout its range, sage grouse (Bureau Sensitive) is a species of high public interest and may be petitioned for federal listing as either a threatened or endangered species. National interest and concerns have led BLM to work with state and federal agencies and private interest groups to develop short term management guidelines. Current efforts are now formulating on long-term management goals and objectives for sage grouse.

Sage grouse is a western bird that relies primarily on sagebrush for its nutritional and habitat needs and is considered an “obligate species” or “indicator species”. This means their population success can be directly tied to the environmental conditions of the sage-steppe habitats they occupy.

Sage grouse are found throughout the range of big sagebrush, but numbers throughout the west have been declining for many years. These declines are primarily due to loss, degradation, and fragmentation of habitat (Wallestad 1975a). From the late 1800s through

1931, degradation of habitat from improper livestock grazing and excessive harvest caused severe declines of sage grouse populations (Edminster 1954). By 1940, sage grouse occupied only half their historic range in Oregon, and numbers declined 60 percent between the late 1950s and the early 1980s (Crawford and Lutz 1985). These declines led the USFWS to list the western subspecies of sage grouse as a candidate for threatened and endangered status (Federal Register, 18 September 1985).

Sagebrush is the most important plant for sage grouse because they use it for food and cover all year long. Grouse like to eat small flowering plants (called forbs) when available, usually from early spring to mid summer. Forbs grow in the sagebrush plant community, contain high nutrient levels and are easily digestible.

Sage grouse prefer large blocks of sagebrush habitat in late seral condition. Association with dense sagebrush stands typically begins in September and continues through the breeding season. Wintering areas are crucial to sage grouse because they are a major factor in determining their distribution. Elimination of winter range habitat can reduce sage grouse populations over large areas (Eng and Schladweiler 1972).

Quality nesting habitat is one of the most important factors in the success of sage grouse populations. A primary function of nesting habitat is the protection of the hen and her nest from predation, which is the primary factor influencing sage grouse nesting success in Oregon (Batterson and Morse 1948, Nelson 1955). While predation may be the most immediate cause of nest failure, the underlying cause may be a lack of adequate cover at nests that makes them easier to see and more vulnerable to predation (Gregg *et al.*, 1994).

The BLM manages approximately 90 percent of the lands currently inhabited by sage grouse (BLM, 1994). Beginning in the 1940s, the Prineville District, BLM in cooperation with ODFW has monitored sage grouse populations through annual strutting ground counts, referred to as "Leks." Approximately 19 percent of the northern planning area is currently used by sage grouse and is mapped as sage grouse range (See Map S-12: Sage Grouse Habitat). Within the planning area, grouse occur in the Skeleton fire area, Millican Valley, West Butte, Bear Butte, and Pine Mountain. This population is considered to be located on the western fringe of their range.

In the planning area, grouse numbers have varied over the years due to several factors including: drought; predation; habitat loss and degradation; and natural population fluctuations. In Oregon, the BLM Prineville District began a sage grouse study in 1988 because of declines in the number of males on leks. The purpose of the study was to define seasonal use areas and determine the overwintering population.

Studies in the planning area identified several important seasonal use areas, located new strutting grounds, and helped determine grouse distribution and suitable habitat types.

Currently, four leks are used for breeding. The largest occurs in Millican Valley. Used year after year, these sites are important to protect for future use. Studies in Wyoming indicate that disturbances on and around the lek that removes substantial vegetation could affect the local populations to the point of extinction (Higby, 1969).

The highest percentage of nesting occurred in the higher elevation areas surrounding Millican Valley where important nesting included Pine Mountain, Horse Ridge, West Butte and Bear Butte. Sage grouse nest in the mountain big sagebrush, mountain shrub, and grassland cover types, and the nest center of successful nests had taller grass and more tall shrubs than the nest center of unsuccessful nests (BLM, 1994). Habitat structure appeared to be as important to nest success as habitat type. These same high elevation areas are important for brood rearing as well, where forbs were more abundant and available throughout the summer.

Millican Valley is a very important area for the winter survival of sage grouse where over 100 birds spend their winter. Comparatively mild weather and fairly good sagebrush cover is the primary reason for this seasonal use.

Habitat quality is variable within the known use areas. The low elevation valley floors have a large component of annual plants and rabbitbrush, which is not ideal habitat for sage grouse but does provide cover during winter and forage during the early spring. The higher elevation areas are in good to excellent condition and have an abundance of important forbs.

The greatest effect on sage grouse is the destruction or adverse modification of their habitat. During the past 40 years, sagebrush valleys and foothills have been sprayed, plowed, chained, burned, disked, or cut in an attempt to convert these ranges to grasslands. Recent habitat protection and prescribed burns appear to be benefiting the sage grouse in the planning area. In the Millican and West Buttes area, a large percentage of lands are in mixed ownership between BLM-administered and private lands.

Lek viewing has become popular in the Millican area. BLM has been monitoring established viewing opportunities since 1995. Conflicts between humans and grouse viewers have prompted viewing restrictions to allow grouse to complete breeding. Recent management efforts have resulted in better viewing and less disturbance to the birds.

Vegetation management projects have been done to improve sage grouse habitat. In the Horse Ridge and West Buttes area, projects such as prescribed fire, lek mowing, and water developments have improved habitat for sage grouse.

Mountain quail (Bureau Tracking) prefer open forests and woodlands with a brushy understory (Csuti *et al.*, 1997). In eastern and Central Oregon, these quail can be found in close association with riparian areas, or meadows next to forest edges. Their preferred food consist of buds and flowers, berries, and insects such as grasshoppers, beetles and ants. During winter, seeds of a variety of plants make up most of the diet. Mountain quail are ground nesting birds and generally have very small home ranges (often staying within 1 square mile).

Mountain quail were once abundant throughout many areas in central and eastern Oregon. Numbers have been declining for several decades (ODFW, Bend), and the factors causing these declines are not fully understood. Although not common, mountain quail exist in several areas within the northern planning boundary. Small populations can be found in and near Bear Creek, Prineville Reservoir, and on scattered parcels of BLM lands north of Prineville, and north and east of Sisters. These quail exist in drainages with some amount of shrub type vegetation, brushy areas at the base of rimrock ledges, and around brushy seeps or springs. The planning area has not been surveyed for mountain quail and their population size and distribution is poorly known.

Although mountain quail are a game bird in Oregon, most populations in eastern Oregon are closed to hunting with exception of Wallowa and Hood counties.

Other Bureau Sensitive Birds

The pygmy nuthatch (Bureau Sensitive) is one of three resident nuthatches that occurs in the planning area. The pygmy nuthatch uses open coniferous woodlands. In Oregon they are believed to be tied to ponderosa pine communities. This is a cavity nesting species that creates its own nest sites and typically feeds on insects.

The Olive-sided flycatcher (Bureau Tracking) is found in several locations in the planning area. Although not found to be abundant, this flycatcher can be seen in forest habitats

near La Pine, Bend, and Redmond, and is suspected to occur on BLM lands north of Sisters. These birds like to forage on bees, flying ants, flies, small beetles, mosquitoes, and other flying insects (Csuti *et al.*, 1997). No surveys have been conducted for this species, therefore population sizes and range is unknown.

Willow flycatchers (Bureau Tracking) are less common in the planning area. Typical habitat occurs around willows at the edges of streams, meadows and marshes. This bird prefers thick vegetation around water. Except for the major river corridors and a few ponds and canals, preferred habitat does not occur in quantity or quality. No surveys have been conducted for this species, therefore population sizes and range in the planning area is unknown.

Sage sparrows (Bureau Tracking) are considered sagebrush obligates. Although sage sparrows can be found in grasslands they are usually not far from sage stands. Sage sparrows eat soft bodied insects, green foliage, and seeds usually found on the ground (Csuti *et al.*, 1997). Sage sparrows are common in the pure stands of big sagebrush near Millican and Horse Ridge area, the Badlands WSA, and west of Redmond. Sage sparrow populations are thought to be declining throughout its range. No surveys have been conducted for this species in the planning area; therefore population size and range size is unknown.

White-headed woodpecker (Bureau Sensitive), a species of concern, is found in both the La Pine block and the northern portion of the planning area. This species is closely associated with ponderosa pine or ponderosa mixed conifer stands (Csuti et. al., 1997). It requires large trees for foraging and snags for nesting, both characteristics of older forest stands. The woodpecker forages mostly on insects and seeds of ponderosa pine. Known occurrences of this bird have been documented around Pine Mountain, scattered BLM administered lands north of Sisters, and in the La Pine area. No surveys have been conducted for this species in the planning area; therefore the extent of the population range and size is unknown.

Black-backed and three-toed woodpeckers (Bureau Sensitive) normally occur in forests of fir, lodgepole and ponderosa pine, or mixed conifers (Csuti *et al.*, 1997). Diet consist of wood-boring beetle and their larvae, ants, spiders, and occasionally fruit, bark, seeds, and cambium. Surveys conducted by BLM personnel in the La Pine block found that the black-backed woodpeckers are common to abundant throughout the area.

Three-toed woodpeckers also occur in La Pine but in fewer numbers. These birds were found using lodgepole pine and ponderosa pine habitats. The abundance of wood-boring beetles in this area is most likely the reason these woodpeckers occur here. Potential habitat occurs in the northern planning area north of Sisters, but no surveys have been conducted. Burned areas that occur in the La Pine area provide feeding and nesting potential for three-toed and black-backed woodpeckers. Lack of fire on BLM administered lands has not allowed for habitat improvement for these species of woodpeckers.

The Lewis woodpecker (Bureau Sensitive) occurs occasionally in both the northern planning area and the La Pine block. Typical habitat is in white oak woodlands, but they are also found in ponderosa pine and cottonwood riparian woodlands in eastern Oregon (Csuti et. at, 1997). Their diets consist of beetles, ants, grasshoppers, flies, and spiders. Lewis woodpeckers occur around the cities of Bend, Redmond, and La Pine and along the Deschutes River corridor. No surveys have been conducted for this species; therefore the extent of the population range and size is unknown.

Yellow rail (Bureau Sensitive) occurs occasionally in the planning area. Observations have been made in the La Pine area, and in ponds and canals near Redmond. Typical habitat is freshwater marshes and wet meadows with a growth of sedges and willows,

and they utilize shallow bodies of water (Csuti *et al.*, 1997). Although this bird occurs in small numbers, pairs have been found breeding and raising young in Central Oregon (Schmidt, personal communication). No surveys have been conducted for this species; therefore the extent of the population range and size is unknown.

The Upland Sandpiper (Bureau Sensitive) has potential habitat in the La Pine block and there has been a single sighting there (Demmer, personal communication). This species occupies flooded meadows and grasslands, usually with a fringe of trees and often near high elevation sagebrush stands (Csuti *et al.*, 1997). No surveys have been conducted for this species, therefore the extent of the population range and size is unknown.

Neo-tropical Migrants

Though many of the birds previously listed are neo-tropical migrants, this discussion is on the broader species of birds that breed and raise young in the planning area in the spring and summer, then migrate south to areas in Mexico and South America during the fall and winter. These birds range from small sparrows and warblers to large woodpeckers and raptors.

Recognized as one of the most important habitats for these birds are the riparian plant communities lining the rivers, creeks, and irrigation canals. Relatively minor in terms of total acres in the planning area (only 1 percent of landscape), these areas provide breeding habitat for more species of birds than any other vegetation type in North America. Up to 75 percent of bird species breed in riparian zones (Johnson and O'Neil, 2001). Primarily in deciduous riparian woodland, abundance of breeding birds can be 10 times greater than the surrounding uplands.

As previously described in the vegetation section, the shrub zone and its associated understory vegetation provides the basic habitat needs for a vast number of wildlife species. In addition, the unique presence of the juniper woodlands, in both its natural old growth form and the younger invasive type, provides more structure to the environment, which many wildlife species find attractive.

Many species of breeding birds are dependent upon sagebrush as their primary habitat. Several passerine birds depend on shrubs for most of their life cycle. These birds nest in the fields and forage on seeds, buds, or insects in the area. Pure stands of big sagebrush occur in the Millican and Horse Ridge area, the Badlands WSA, and west of Redmond. Certain species are "sagebrush obligates", which means they depend on sagebrush for cover and forage for part or all of their life cycle. Species common in these habitats include sage, Brewer's and vesper sparrows, sage thrashers, and green-tailed towhees. Horned larks are abundant throughout the planning area in the shrub steppe zones.

The low sagebrush areas located near Prineville and the Bear Buttes area are in excellent range condition, rich in forbs and are providing important foraging areas for neo-tropical migrants.

Old-growth juniper woodlands provide valuable wildlife habitat for a diverse mix of species. As a juniper tree matures and becomes decadent, structural changes occur which result in hollow cavities and other protected niches where birds can take shelter, nest, and rear their young. Many bird species forage on juniper berries. Wildlife studies in Central Oregon have determined that old-growth juniper attracts a high diversity and abundance of wildlife, including mountain chickadees, Cassin's finches, shipping sparrows, dark-eyed juncos, house finches, mourning doves, brown headed cowbirds, ash-throated flycatchers, pinyon jays, northern flickers, and red-breasted nuthatches.

In La Pine, dead standing trees or snags are widely recognized as essential habitat for many wildlife species. Retention of snags and downed logs is needed to support cavity-

nesting species such as hairy and white headed woodpeckers, pygmy nuthatch and mountain chickadee. Grasses, forbs and shrubs typically invade in the treated forest areas. These areas provide habitat for a unique subset of wildlife species. Ongoing changes to these important plant communities, many of them caused by humans, have resulted in alterations to the habitat within the planning area. Encroachment of juniper is converting shrublands to woodlands, primarily because of changes in natural fire regimes.

The loss of vegetation reduces forage needed for wildlife and livestock, as well as habitat for ground nesting birds. Juniper dominated sites can eventually reach a point where understory vegetation is sparse and will not carry fire, and remnant grasses and forbs are not capable of repopulating the area even if the juniper were removed. Species composition has been altered in these areas throughout the planning area.

Mammals

Bats

Bats are a unique form of terrestrial animals whose consumption of a variety of insects makes them an important part of the ecosystem. There are two types of bats in Oregon, colonial type bats like the little brown bat, pallid bat, Brazilian free-tailed bat, western pipistrelle, and the solitary types, including the hoary bats, and silver-haired bats. Although, some bats use trees for roosting, most bats rely on a variety of non-tree like structures including cliffs, lava outcrops, caves, mines, bridges, and buildings (Perkins 1984).

Management of bat populations is dependent upon the availability of roosting and foraging areas (Perkins 1996). The diet of most of the bats in planning area include cutworm moths, pine bark beetles, crane flies, biting flies, and mosquitoes (Perkins, 1996). In urban areas, most bat species are found in smaller numbers and at fewer locations when compared to rural locations. This may be the result of lower insect numbers and diversity (Johnson and O'Neal 2001). Except in a number of known caves, little is known about the distribution, and species diversity of bats in the planning area.

Bats may use these habitats in several ways. The most obvious use is as a daytime resting place (roost) for these nocturnally active animals. This occurs during the warm part of the year when they are most active. Another use during this time of year is as a temporary resting place at night between foraging bouts. Such use may vary seasonally depending on the ability for year round protection from weather and predators. Sometimes, an infrequently used summer roosting site will be attractive to bats in the fall, especially at night, when they congregate for breeding. Caves provide year round habitat but are a major source for hibernaculum of dormant bats during the winter. Most species have specific habitat requirements for such use, and will use different parts of a cave depending on temperature and other factors.

In the planning area, mines, cliffs, caves, lava tubes and lava outcrops are the key habitats for a variety of bats. A mist netting survey conducted by Cross in 1976 (A Survey of Bat Populations and Their Habitat Preferences in Southern Oregon) revealed 10 species of bats found on BLM-managed lands. These species included Townsend's big-eared, big brown, silver-haired, pallid, California myotis, long-eared myotis, small-footed myotis, long-legged myotis, little brown myotis, and the yuma myotis. Perkins surveyed historical hibernacula and roost site locations in 1986 (Central Oregon Survey for Townsend's Big-Eared Bat).

Perkins (1986) pointed out that cave habitats in Oregon have not been managed specifically as habitat for bats and are subject to increasing human disturbance, which could result in a decline of available habitat for bats. Inventories to establish a complete

distribution of the Townsend's big-eared and other bat species on BLM administered lands are needed before habitat protection can be provided.

Disturbances from humans and domestic cats are major problems for bats in urban setting, because of disturbances to night roost sites, maternity sites, and hibernaculas. Bats use snags and large trees with structural defects for roosting, and typically use areas with less canopy closure and understory vegetation and are close to water.

Townsend's big-eared bat (Bureau Sensitive) has received special attention from local biologists. These bats occur in a wide variety of habitat types from arid desert shrub communities to pine forests. This species uses caves and cave-like structures, including abandoned mine shafts and tunnels for summer roosting and hibernating or wintering habitat. Caves are a critical component of this bat's habitat requirements, both as hibernaculum in the winter and as roosts for summer nursery colonies. They also require wet meadows and riparian areas where they can forage for flying insects. Habitats free from human disturbance are apparently required by this species. Surveys have been conducted in many areas within the planning boundary. More than 25 percent of the entire population of this species occurs in Central Oregon.

Eight additional bats have Bureau status including two Bureau Assessment (Brazilian Free-tailed bat) and six Bureau Tracking species (pallid and silver-haired bats, western small-footed, long-eared, long-legged and yuma myotis bats). Surveys conducted in a variety of locations in the planning area have shown some of these bats to occur. The majority of the species can be found in the area associated with caves and lava formations. The silver-haired bat is the only one that is dependant on trees for roosting (Perkins and Cross 1988). During the summer months, many of these bats can be found near persistent water sources. Surveys at Reynolds and Mayfield ponds found bats to be abundant near these sources in June through September (Perkins 1996).

Although several surveys have been conducted in the planning area, the full extent of the population range and abundance of these sensitive bat species has not been determined. Special management areas have been implemented which closed several caves to human uses and protects known populations of bats using the caves as a hibernaculum and for nursery purposes.

Mule Deer

The public has a high level of interest in mule deer for hunting and viewing (Wallmo, 1981). However, in some suburban and agricultural areas, the deer can become a pest, as it feeds in alfalfa fields, home gardens, and browses residential shrubs. Mule deer are the most numerous, adaptable, and widely distributed of the mammals such as deer, elk, and pronghorn. The majority of mule deer found on the planning resource area are part of the migratory herd that migrates through or use seasonal winter ranges. Local herds that reside year-round are usually located near agricultural areas.

Adequate food, water, and cover are essential to the survival of deer. Where food, cover, and water are close together, the range of individual deer is small. However, home ranges of resident mule deer can be large. If snow conditions make higher elevations unsuitable, deer will move to suitable range in lower elevations. In general, higher elevations are used as summer ranges and areas below 4,500 feet are considered winter range (See Map S-9: Deer Habitats). Seasonal movements and routes can be critical to maintaining migratory habitat.

The value of timberland for deer is proportional to the degree that it is broken and interspersed with openings. Deer numbers on forested lands are usually highest where openings that support low-growing palatable shrubs and forbs are scattered through the forest.

Thermal cover is critical on winter range to provide protection from wind and other adverse elements. Grassy slopes, meadows, brush fields, and other early successional stages provide the majority of deer forage. During hot summer weather thermal cover provided by late, mature, old-growth seral stage forests, and juniper/big sage/pronghorn bitterbrush shrublands provide shade and reduce heat stress on the animals.

Habitat conditions on the winter ranges within the planning area vary considerably and are site specific. It is generally recognized by wildlife biologists and range managers that it is extremely difficult to precisely measure habitat condition and productivity and even more difficult to relate these measures to herd parameters (Carpenter and Wallmo, 1981). The winter range is primarily juniper woodland and sagebrush communities with interspersed grasses. Browse is the major component of the winter diet, primarily pronghorn bitterbrush, big sagebrush, and western juniper.

While comprehensive monitoring data is lacking on browse condition and habitat condition and trend on mule deer range, it is known that the type, amount, and condition of vegetation have changed due to aggressive fire suppression. Due to fire suppression on some mule deer wintering areas, bitterbrush is old and dying and little reproduction is occurring. There is very little reproduction in the stands in the form of seedling establishment and many of the browse plants are growing out of the reach of deer. The stands are still producing some browse for wintering deer and the decaying and dead plants are providing valuable thermal and hiding cover.

A minimum cover to forage ratio of 30 to 70 was set in a Memorandum of Understanding with ODFW in 1990 to protect deer, elk, and pronghorn migratory habitat. Desired cover to forage ratios are documented at 40 to 60 by Thomas *et al.* (1979) and at 45 to 55 by Leckenby *et al.* (1982). On the mule deer migration corridor areas near La Pine State Recreation Area and south from La Pine, 51 percent and 37 percent respectively, of BLM-administered land remains as hiding cover. However, stands are deficient in meeting cover requirements because of the long distances that animals must travel between patches.

In the planning area four mule deer winter ranges have been identified by ODFW and nine winter areas that have been designated by BLM as crucial deer winter range. Mule deer winter range is established because they are unique and important to the health of the mule deer population.

Mule deer migration corridor in the La Pine management area receives use by 21,500 migrating mule deer annually (ODFW, 2001). Mule deer descend from summer range on the eastern slopes of the Cascades to their lower elevation winter ranges. Use is concentrated in the area immediately south of Lava Butte near the La Pine State Recreation Area and between La Pine and Gilchrist. Mule deer populations are presently below ODFW management objective numbers.

South of U.S. Highway 20, approximately 5,360 acres of public land lies within the boundary of the Tumalo Mule Deer Winter Range. The management objective for this area is to maintain 2,500 deer. Currently, numbers are just under the objective. Motorized vehicle use has been restricted from December 1 through March 31 annually on many roads within the winter range. Motor vehicle use disturbs wintering mule deer during this time.

The North Paulina Winter Range includes 3,750 acres of public land in the Bend-Redmond management area. The management objective for this area is to maintain 5,500 deer.

The northern portion of the Cline Buttes management area contains 9,240 acres designated as a portion of the Metolius Mule Deer Winter Range. The management objective for this area is to maintain 6,200 deer.

The Smith Rock management area is designated by ODFW as mule deer winter range. An estimted 175 mule deer use this area. However, the area is believed to be capable of supporting approximately 200 wintering mule deer (ODFW, 1994). Mule deer use a combination of both public and private lands, including the adjacent Crooked River National Grassland (CRNG) of the Ochoco National Forest.

Mule deer and elk frequent many areas around La Pine. Two major migration corridors have been identified in the La Pine area. These two corridors run for approximately 15 miles starting about 4 miles north of La Pine down to just north of Gilchrest. These corridors serve as connective habitats for the winter movement of animals traveling from the Cascade Mountains east to their winter ranges.

Harassment of deer by humans using motorized vehicles during stress periods, such as cold winters and hot summers can impact deer but it is difficult to quantify. Seasonal road closures are important to protect wintering deer from harassment and to protect wildlife habitat from trampling impacts. The road closures are in effect each year from December 1 through March 31 and have been successful in reducing harassment and poaching.

Fall transition ranges are similar in their composition of vegetation to summer ranges and include coniferous forest/shrub communities. Deer tend to remain at the highest possible elevations until forced on to winter concentration areas by snowfall.

As the human population increases in the urban interface, conflicts with wintering and resident mule deer have also increased. Developments which subdivide the land restrict passage by mule deer and Rights-of-Ways issued on public land bring humans into closer contact with wildlife. In some suburban and agricultural areas, the species can become a pest, as it feeds in alfalfa fields, home gardens, and browses residential shrubbery. In areas where public and private ownership are interspersed, BLM administered lands often serve as habitat islands for wildlife. Mule deer may forage on adjacent private alfalfa fields but retreat to BLM land for safety and cover.

Rocky Mountain Elk

Elk can be found throughout the planning area in all vegetation types. Although juniper woodlands is not considered “ideal” habitat, elk have adapted to this environment and have been rapidly expanding in this area for the past 10 to 20 years. A combination of factors has increased foraging opportunities for elk and may be contributing to their expansion in the area. The development of agriculture and small ranches adjacent to large blocks of BLM administered lands provide green forage and increase the availability of water nearly year round. Healthy populations of elk in the Ochocos have been expanding into juniper and sagebrush habitats during the past 15 years.

Additionally, habitat improvement projects on BLM administered lands have made these lands more attractive to elk. Juniper management, timber harvest, heavy fuel reductions, prescribed burns, natural wildfire, guzzler installations, native shrub and grass plantings, and increased travel management restrictions have all contributed to better habitat conditions attractive to local elk herds.

Elk are considered grazers and mainly feed on grasses. During the spring and summer, elk forage on a variety of plants including forbs and grasses, and in the winter, they use sagebrush, bitterbrush, grasses and agricultural lands.

Although elk occur throughout the planning area they are most abundant in areas east of U.S. Highway 97 and in the La Pine area. Elk tend to occur in small groups but can also be found in herds of 150 to 200 animals. Resident herds are most often found in areas around the Badlands, West Buttes, Powell Buttes, Mayfield Pond/Alfalfa area, Millican Plateau, Combs Flat/Juniper Canyon area, Ochoco Reservoir, and Prineville Reservoir.

During the winter, elk concentrate in larger herds and several wintering areas have been identified and are recognized as important by ODFW. ODFW conducts surveys twice a year, during August and early March, to determine herd composition and productivity. Elk numbers are currently at 20 percent above the management objective for this area.

In the Powell Buttes, Mayfield Pond and Alfalfa areas, disturbances such as old burns, seeded gas pipelines and military use has created increased foraging opportunities here during the past decade. Low road density, limited public access, rough road conditions, large blocks of undeveloped lands, and relatively low human disturbance are probable factors for the successful establishment of this herd.

Another large grouping of elk occurs in the northern part of the Badlands extending north through the Millican Plateau, West and Bear Buttes, and sometimes cross U.S. Highway 20 into the Horse Ridge area. These animals generally occur as two groups totaling about 250 to 300 animals. The largest numbers of animals use the Millican Plateau between Reservoir Road and Prineville. Habitat here is big sagebrush mixed in old growth and invasive juniper woodlands. Disturbances such as old burns, crested wheatgrass seedings, juniper cutting on private lands, and large powerline corridors have created increased foraging opportunities here during the past decade of elk expansion. Road densities are higher in this area than surrounding areas, but off road use is currently limited to designated roads and trails associated with the Millican OHV area. Several wildlife guzzlers occur in this area providing water year round. The area east of Millican road is designated as crucial pronghorn winter range and is used heavily during the winter.

In the Combs Flat/Juniper Canyon, Eagle Rock/Prineville Reservoir areas ownership is a mix of BLM, state and private lands. This area is mostly private ranches. The elk in this area occur in scattered groups for most of the year but congregate into agricultural fields during the summer and fall months. Only small isolated tracts of BLM administered lands occur north of Ochoco Reservoir. The habitat here is a mix of pine, juniper and big and low sagebrush.

Herd migration and intermixing opportunities are limited throughout the planning area due to increased development of private lands and the mixed ownership pattern. Elk do not tend to use distinct travel corridors but in some areas have developed trails from hiding cover to foraging areas. Increasing human development has resulted in increased density of fences on private lands designed for livestock containment or protection of structures, which forces animals around private lands.

Conflicts have started to arise with the expanding elk populations. When disturbed, elk run through fences instead of jumping over them causing property damage. Also, in the summer and fall these elk are traveling in large groups and when grazing in agricultural fields they can cause financial losses to ranchers. Elk are found using agricultural fields throughout the entire planning area.

There are approximately 200 to 250 elk using in the Clines Buttes area (west of 97 in the northern planning area). These animals often travel throughout the area between Tumalo, Cline buttes, and the Lower Bridge area. These animals use BLM and Forest Service lands for hiding, escape and resting cover, while foraging on agricultural lands. Herd sizes vary but elk generally travel in groups of 30 to 40 animals and sometimes use small local areas. Elk numbers are currently exceeding the management objectives for the area

and the number of crop damage complaints is rising in the area (Steven George, ODFW, personal communication). Seasonal use areas and important wintering areas have not been determined for these animals. Additionally, there are no distinct migration routes in this area, and the elk don't stay in one particular area for very long.

Elk numbers are increasing in the La Pine area during the past 10-12 years. The Brothers/ La Pine RMP states that in 1982 the number of elk was around 70 animals. Currently 150 to 200 elk reside in and around the La Pine and readily travel back and forth across U.S. Highway 97. Water is available but in some cases elk foraging east of 97 must cross the highway to get water from wildlife guzzlers. The Little Deschutes River, wet meadows and springs also provide year round water.

Timber cutting in the area has created ideal cover to forage ratios encouraging the elk to stay in the area. No areas have been identified as important seasonal habitats. Increasing bitterbrush, grass and forbs in the treated areas has added to the ability for elk to flourish. Elk use the same corridors as deer in areas with sufficient connective habitat.

BLM administered lands are scattered throughout the Grizzly Mountain and Grey Butte areas where elk use undisturbed private lands and the national Grasslands. Herds have been expanding in this area and crop damage is a concern.

Pronghorn

Pronghorn can be found throughout the planning area in juniper occupied shrub zones. Although juniper woodlands are not considered "ideal" habitat, like the elk, pronghorns have adapted to this environment and have been expanding in this area for the past 10-15 years. Certain types of disturbances in local areas have increased foraging opportunities for pronghorn that may be contributing to their expansion in the area. Possible features or disturbances attracting pronghorn into juniper shrublands are water availability, crested wheatgrass seedings, natural and prescribed fires, agricultural fields, forb rich disturbed areas, and large blocks of undeveloped lands.

Typical pronghorn range is an open sagebrush environment that is rich in broad-leaved herbaceous vegetation. Pronghorn forage primarily on forbs and grasses during the spring and early summer. The rest of the year, they depend upon sagebrush, bitterbrush, and grass. Low sagebrush is usually an important component of their habitat and diet but only occurs in 8 percent of the planning area.

Pronghorn are usually found in close proximity to water, which is sparsely distributed throughout the area. Climates that reflect the best habitats and productivity are in areas that receive 10-16 inches of precipitation per year (Sundstrom *et al*., 1973). The average local precipitation levels vary across the pronghorn habitat in the planning area from 8.62 inches per year in Redmond to a high of 11.70 inches per year in Bend. Average precipitation is about 10 inches per year in the Millican and Prineville areas (State Climate Data).

In the planning area, home ranges of summer herds vary from 10 to 20 square miles and pronghorn generally form small groups of 4 to10 animals. During winter pronghorn gather into larger herds using specific geographic areas. Several of these wintering areas have been designated as crucial winter range for pronghorn by ODFW and BLM. Winter home ranges tend to be smaller except for temporary movements. During winter, pronghorn have been seen migrating in large groups (up to 130 animals) between winter areas, but usually for short periods of time.

During the past several years, ODFW has conducted surveys during August and early March to determine herd composition and productivity. The BLM and ODFW have used this pronghorn census data and other observation data to map the potential pronghorn

habitat in the planning area, and the current known use areas. Pronghorn currently use 40 percent of their potential habitat in the planning area.

Pronghorn productivity and recruitment is low within the planning area compared to typical "open range" habitats more common to the Great Basin area to the east and south of the planning area. Common factors that can limit productivity are predation, fences, distribution of water, and low precipitation levels causing poor forage quality (Ferrel, 1952). Deming (1959) believed that climate and range conditions were possible reasons for low pronghorn productivity on marginal ranges, with noticeable increases during wetter years.

Approximately 500 pronghorn reside in the planning area and are a common sight on the landscape east of U.S. Highway 97, and occasionally occur in the La Pine area. Except during winter, pronghorn generally occur in small groups and use specific areas made up largely of BLM-administered lands. These local herds are found year round in five land areas: Redmond/Mayfield Pond/Alfalfa area; Millican Plateau; West Buttes/South Millican/Skeleton area; Combs Flat/Juniper Canyon area; and north of Ochoco Reservoir.

Pronghorn are dispersed throughout the planning area but usually occur as distinct herds using general geographic areas. The Redmond/Alfalfa herd ranges from 130 to 150 animals and uses BLM lands southeast of Redmond. There is little use north of State Highway 126 in the Redmond area but occasional movement of animals across the highway occurs.

Directly south of Redmond a herd of 50 to 60 pronghorn reside year round and occur mainly in the area between Powell Butte highway and the railroad tracks just east of U.S. Highway 97. This herd mixes with an additional 80 to100 pronghorn that use the area extending south and east of Powell Butte highway into the Mayfield Pond and Alfalfa areas. Disturbances such as old burns and seeded gas pipelines have created increased foraging opportunities here during the past decade. Low road density, limited public access, rough road conditions, large blocks of undeveloped lands, and relatively low human disturbance are probable factors for the successful establishment of this herd.

Another large grouping of pronghorn occurs in the northern part of the Badlands extending north through the Millican Plateau up to State Highway 126 between Powell Butte and Prineville. These animals occur generally as two groups totaling about 160 animals. The largest proportion of animals uses the Millican Plateau between Reservoir Road and Prineville. Low sagebrush is a component of the Plateau that pronghorn use year round. Disturbances such as old burns, crested wheatgrass seedings, juniper cutting on private lands, and large powerline corridors have created increased foraging opportunities here during the past decade of pronghorn expansion. Road densities are higher in this area than surrounding areas, but use is currently limited to designated roads and trails associated with the Millican OHV area. Several wildlife guzzlers occur in this area providing water year round. The area east of Millican road is designated as crucial pronghorn winter range and is used heavily during winter.

West Buttes, South Millican and the Skeleton Fire area support approximately 125 pronghorn. These animals are dispersed in small groups throughout the spring, summer and fall months, but tend to congregate in a large group in South Millican during winter. Portions of their use areas have been previously designated as crucial pronghorn winter range in the Brothers/La Pine RMP.

The West Butte/Millican herd often mixes with pronghorn outside the planning area towards Brothers. The Millican and Skeleton Fire areas are open sagebrush environments that are more typical pronghorn habitat, and are connected to the Great Basin range where pronghorn occur more frequently across the landscape. Foraging opportunities

are abundant in South Millican and within the Skeleton Fire area. Water is limited in this area where pronghorn use water from guzzlers, stock troughs, snow pack, and occasional rains.

The Combs Flat/Juniper Canyon area supports a local pronghorn herd of about 75 to 100 animals. In this area, ownership is a mixture of BLM-administered, State and private lands, but it is mostly private land ranches. In this area pronghorn occur in scattered groups for most of the year but congregate into agricultural fields during the summer and fall months. Low sagebrush and early seral areas provide the main forging areas for this herd. Crucial winter range designations have been made in the Combs Flat area on both sides of the Paulina Highway.

Only small isolated tracts of BLM administered lands occur north of Ochoco Reservoir where a herd of 30 to 60 pronghorn live year round. Pete Creek, mostly in private ownership is the center of activity for this herd. The habitat here is a mixture of pine, juniper and big and low sagebrush. Little is known about the movement and local habits of these pronghorn. There are occasional sightings of pronghorn crossing U.S. Highway 26 south into the Comb Flat area, suggesting that there is some mixing of the pronghorn herds.

Herd migration and intermixing opportunities are limited throughout the planning area due to increased development of private lands and the mixed ownership pattern. Crossing structures such and roads and range fences are all common barriers to pronghorn movement, which can have a negative effect on pronghorn mobility. Increased human development has resulted in increased density of fences on private lands designed for livestock containment or protection of structures, which forces pronghorn around private lands.

Travel corridors tend to occur in condensed areas between Powell Buttes and the Millican Plateau north of Alfalfa; south of Alfalfa into the Badlands and across U.S. Highway 20 into the Horse Ridge and Skeleton Fire area. The West Butte provides a central pivot point in which pronghorn can disburse to the Millican Plateau, the Badlands, south Millican and east towards Brothers; and the Combs Flat/Juniper Canyon area to the north of Ochoco Reservoir and U.S. Highway 26.

The CRNG immediately north of the planning area towards Madras is home to 100 to 200 animals. Occasionally these animals have been seen in the Terrebonne area suggesting that these animals could intermix with the Redmond herd.

Big Horn Sheep

California big horn sheep were common throughout Central Oregon in the early 1900s when they apparently disappeared as a result of disease (from domestic sheep) and over-hunting. A healthy population once occurred in the Crooked River Gorge in the vicinity of Crooked River Ranch. Federally, the California big horns are a species of concern, but many populations in the state are thriving well in areas where they have been reintroduced.

Typical habitat for big horns is composed of sagebrush-grassland found in steep rocky mountain ranges, foothills, river valleys, canyon gorges and escarpments. These rugged areas provide escape, lambing, breeding, and foraging habitats and thermal protection. Sheep are dependant on water using any source available. Their home range varies from 7 to 15 square miles. Sheep are active throughout the year and form small dispersed groups during spring and summer and congregate in larger groups during winter. Big horn sheep's diet is primarily made up of grass especially bluebunch wheatgrass and cheatgrass. However, their diet can change seasonally, from grasses and forbs in the spring to woody shrubs in the winter.

ODFW conducted a statewide inventory of current and historic range for big horn sheep and the current habitat conditions. They prioritized suitable areas for re-introduction of big horn sheep. The Crooked River Canyon was determined to have suitable habitat for a population of approximately 75 sheep. This area is currently ranked number one for the next potential release site.

The Crooked River Canyon near Crooked River Ranch is currently occupied by feral sheep descended from mouflon, Barbados and Hawaiian sheep introduced several decades ago. Approximately 100 of these animals roam throughout Crooked River Ranch, and are loved by some residents, but a pest to others. These sheep can carry the disease Pasteurella, which is considered deadly if contracted in native big horn sheep. Land ownership in the area is mainly BLM-administered lands mixed with private land and CRNG lands. The feral sheep use the Crooked River Ranch area and stay mainly in the canyon on BLM-administered lands but will frequently use water and feed on private lands adjacent to the canyon.

Pacific Fisher

The fisher (Bureau Sensitive) is a medium sized carnivore found in forest lands across North America. Fisher populations are extremely low in Oregon (Aubry and Houston 1992). Typical habitat is mixed coniferous forest, and lodgepole pine forests. They prefer mature forest or late-seral forest conditions, and often occur near or along riparian areas. High canopy closure is an important characteristic of their preferred habitat.

Fishers are general predators, and will eat a variety of small to medium-sized mammals and birds. They also will readily eat carrion, fruits and mushrooms. The actual composition of the diet in fishers varies by region depending on the most abundance prey in an area. Young fishers tend to eat more fruits than adults. Snowshoe hares are a major prey item almost everywhere that fishers have been studied. Female fishers raise their young in protected den sites, usually in hollowed out trees or logs.

Ideal habitat does not occur in La Pine although potential habitat does exist. Much of the La Pine area has been set back to an early successional stage due to timber harvest and fuels reduction projects. These habitat conditions are not considered ideal for fisher and the preferred prey of fisher is not abundant in the La Pine area. The best potential habitat occurs along the Little Deschutes River.

California Wolverine

The wolverine is listed by the state as threatened by ODFW. The wolverine has been characterized as being North America's rarest and least known large carnivore. Only limited information exist on their natural history and their current population status of wolverine in Oregon is unknown.

Typical habitat includes boreal forests, but they are known to occupy a variety of habitats including sagebrush scrublands. Wolverine researchers agree, in general, that "habitat is probably best defined in terms of adequate year-round food supplies in large, sparsely inhabited wilderness areas, rather than in terms of particular types of topography or plant associations" (Kelsall 1981).

Wolverine are scavengers that are largely dependent on large mammal carrion, and usually don't kill for their own food. They depend on other predators to provide their food sources. Wolverines can move long distances and occupy large home ranges. Human presence is a deterrent to wolverine since they tend to occupy remote wilderness and other large tracts of undeveloped lands.

Populations of wolverine are not known in Oregon but they are thought to be rare throughout the state. Surveys have not been conducted on BLM lands in the planning area. Observations of wolverines have been made on private lands just of the northern planning area.

The Cascades provide more typical habitat in Oregon, but the La Pine area may provide connective habitat that allows the opportunity for wolverine to travel between the more suitable habitats of the Cascades and the Newberry Crater area.

Other mammals

Populations of the pygmy rabbit (Bureau Assessment) have been declining throughout its range over the past several decades. Potential habitat occurs in the planning area, in which typical habitat for these rabbits is described as areas supporting dense and tall clumps of basin big sagebrush, and areas with deep soils in which the pygmy rabbit use to dig their burrows (Csuti et. at, 1997). Although habitat does occur in many parts of the planning area, only unconfirmed sightings have been made in the eastern portion of the northern planning area. Only localized surveys have been conducted for this species, therefore the extent of the population range and size is unknown.

The range of the Preble's shrew (Bureau Tracking) includes the entire planning area. Typical habitat is near permanent or intermittent streams in arid or semi-arid shrub and shrub/ grassland habitats (Csuti *et al.*, 1997). There have been no studies on diet of this shrew and little is known about its range, and use of habitats. No surveys have been conducted in the planning area';therefore, the extent of the population is unknown.

Mountain lion populations have been increasing in the area for several years and interactions with human have become more frequent as urban areas grow. Mountain lions occur throughout the area and follow the movements of deer and elk which provide their main source of food. Sightings of mountain lions regularly occur in the area of Horse Ridge, Badlands WSA, Cline Buttes, Grizzly Mountain, and urban areas surrounding Bend, Alfalfa, Prineville and La Pine. Coyotes are abundant throughout the area and occur in every habitat type. Badgers, also common throughout the area, occur in much less density than coyotes but are still common in every habitat type. Badgers feed extensively on ground squirrels, and areas with high ground squirrel densities usually have a high density of badger digs.

Amphibians

Amphibians represent an important biotic component of riparian ecosystems. This group of animals includes frogs, toads and salamanders. They are important components of the riparian food chain of detritivores, herbivores, insectivores and carnivores. In some areas the largest proportion of total vertebrate biomass is made up of amphibians. Amphibians depend on water (usually for breeding), using almost all types of water sources with adjacent vegetation. Some frogs and toads spend their winter under insulating layers of leaves or woody debris, while others bury themselves in bottom of muddy lakes or ponds.

Amphibians are considered long-lived animals (life-spans up to 20 years), although most are eaten as prey within five years. Most amphibians don't breed until at least their second year of life, when they seek water sources that are warm and shallow with vegetation to support the success of egg development. Eggs are laid in clutches or singly, depending on the species, and usually on vegetation. Eggs hatch into aquatic larval stage and metamorphose into a terrestrial form (Leonard *et al.*, 1993).

Amphibians have limited mobility and dispersal capabilities, so continuous riparian zones are important pathways to colonize suitable, yet unoccupied habitats. Most

amphibians require an aquatic habitat for part of their life cycle. The exceptions to this rule are the fully terrestrial salamanders of the Plethodontidae family.

Although Central Oregon has a generally low diversity of amphibian species, there are several important species found throughout the planning area. They tend to occur in areas with water in the form of wet meadows, ponds, intermittent streams, artificial canals, and Deschutes River.

The Oregon spotted frog is a federal candidate species officially designated by the USFWS. Historically, spotted frogs were found at elevations from around 600 to 5,000 feet, and ranged from British Columbia through the Puget trough of western Washington and south through western Oregon. It was also found in the Columbia River Gorge, the Klamath Basin in Oregon and California and the Deschutes River Basin (Mcallister and Leaonard 1997). The latter three population centers are now all that is known to remain east of the Cascade crest, and only one population is known to remain west of the Cascade Mountains. Recent surveys indicate a disappearance level of at least 70 percent across its former range (Hayes).

Spotted frogs are most often associated with wetland plant communities dominated by sedges, rushes, and grasses in or near permanent water (Leonard *et al.*, 1993), however, McCallister and Leonard (1997) reported that they are sometimes found in riparian forests. Spotted frogs prefer relatively warm water and are sometimes found in beaver created habitat. These productive emergent wetlands provide a diverse community of invertebrates on which spotted frogs feed. They consume plant tissue, bacteria, algae, detritus, and carrion (McCallister and Leonard 1997). Spotted frogs breed in very shallow water beside ponds or streams, in flooded meadows, or in water pooled on top of flattened, dead vegetation at the edge of a pond, usually in early to mid-spring depending on the temperature.

The Deschutes National Forest and Prineville BLM have recently mapped current and historic range of spotted frogs in Central Oregon. The La Pine block of the planning area is within historic and current range for spotted frogs. Much of the occupied habitat in the planning area occurs in the Little Deschutes River and Crescent Creek.

The Cascade frog (Bureau Tracking) is found in the planning area, but only in rare occurrences, such as in the Little Deschutes River and Squaw Creek. Cascade frogs are more common in the higher elevations of the Cascade lakes and meadows. The typical habitat is large wet meadows that remain damp during the summer months, where large numbers of Cascade frogs occur in the proper habitat. The planning area contains only a few areas with suitable habitat for Cascade frogs and is limited in the quantity necessary to support large populations.

Other amphibian species that can be found in the planning area include the spadefoot toad (in the desert areas east of Bend), the western toad (Bureau Tracking) found throughout the planning area, Pacific tree frog, and the long-toed salamander. The introduced bullfrog also occurs in the planning area, and is common in irrigation ponds, canals, stock ponds and warm water rivers. Western toad populations are declining throughout their range, but this species has not yet been listed as sensitive. Future management may need to consider western toads.

Major threats to the amphibians in the planning area include conversion of wetland vegetation, changing hydrologic conditions, poor water quality, pesticides, herbicides, fertilizers, and introduction of non-native species (i.e. bullfrog).

Reptiles

Reptiles are a group of animals better known as lizards, snakes and turtles. Lizards and snakes occur throughout the planning area but are limited to few species. Turtles are not found in the planning area and there are no documented observations on BLM lands.

Many species of reptiles use riparian zones for foraging because of the high density of prey species, including insects, invertebrates, fish, amphibians, small mammals, and young birds. Snakes, such as the rubber boa, racer, ringneck snake, striped whipsnake, gopher snake, western garter snake, common garter snake, and western rattlesnake are common users of the moist habitats in the planning area. No surveys have been conducted for snakes in the planning area and only occasional sightings have been documented.

Common lizard species in the planning area include the northern sagebrush, western fence, short-horned, side-blotched, and the western skink. Less common but may occur in the planning area are the northern alligator lizard, southern alligator lizard, and the introduced plateau striped whiptail lizard (confined to the area around Cove Palisades State Park).

Typical habitat for the northern sagebrush lizard (Bureau Tracking) includes sagebrush dominated vegetation zones but can be found in open forests of juniper, ponderosa pine and lodgepole pine that has an open brushy understory (Nussbaum *et al.*, 1983). These lizards are normally ground dwellers and use rocks and crevices to escape predators. They rarely climb vegetation more than a few inches off the ground. Sagebrush lizards eat beetles, flies, butterflies, caterpillars, ants, and a wide variety of other insects (Nussbaum *et al.*, 1983).

The sagebrush lizard is found throughout the planning area but is thought to occur in higher abundance on the eastern edge of the planning area where sagebrush is a more dominant vegetation type (Demmer, personal communication). No surveys have been conducted on the sagebrush lizard or its habitats in the planning area.

Fish

The Deschutes River, Crooked River, Little Deschutes River, Crescent Creek, Squaw Creek, Reynolds Pond, and Mayfield Pond are water bodies on or partially on BLM administered lands that support fish. Currently there are no known BLM actions that are significantly affecting the fisheries resource within the planning area. Listed below are the habitat conditions, fish and population status, and management effects for those waters.

Crooked River (BLM administered lands Below Bowman Dam to Lake Billy Chinook)
The Bowman Dam to Prineville section supports a mix of native redband trout, hatchery rainbow trout, and mountain whitefish. This section also supports small numbers of small- mouth and largemouth bass, brown bullhead, and very low densities of nongame fish. Both sections of the Crooked River support several species of indigenous nongame fish including longnose and speckled dace, sculpin, northern pike minnow, chiselmouth, and bridgelip and large scale sucker. Redband trout and mountain whitefish are present in very low densities in the upstream section and abundant in the downstream section.

Fisheries habitat conditions from Bowman Dam to Prineville are mixed due to several factors. The nutrients and cold water sustain a good tailrace fishery, but nitrogen supersaturation, caused when water is spilled over the dam, a reversal of the flow regime from its natural condition, and high turbidity levels limit fisheries production.

Fisheries habitat conditions upstream from the U.S. Highway 97 bridge to Prineville is a mixture of boulder strewn riffles and long glides with a low gradient (0.2 to 1.0 percent). At river mile 28 the North Unit Irrigation District withdraws the "natural flow" an average of 70 cfs for irrigation in the Culver-Madras area. A minimum of 10 cfs is left in the river. Water quality conditions for the section of the river were reported to be moderate to severe for fish and aquatic life (ODEQ 1988).

In the lower river section below U.S. Highway 97, the remote canyon and relatively undisturbed character have resulted in a near pristine cold water fisheries environment. At U.S. Highway 97 (river mile 18), springs begin to augment flows, contributing significantly to constant water flow, cooler water temperatures, and water quality.

Deschutes River Aubrey Falls to Lake Billy Chinook
Wild fish species currently present in this section of the Deschutes River are redband trout, mountain whitefish, chiselmouth and large scale suckers found upstream to Big Falls and Steelhead Falls, respectively, and bull trout (Steelhead Falls to Lake Billy Chinook). Introduced species include brown trout, tui chub, brown bullhead, three-spine stickleback and smallmouth bass (Lake Billy Chinook to Steelhead Falls).

Fisheries habitat conditions in this section of the Deschutes River consists of a narrow canyon with many gradient drops that are barriers to fish migration. The upper end of this section experiences much lower than natural flows due to irrigation withdrawal. The lower end is supplemented by Squaw Creek and spring water that significantly increases flow and decreases water temperature. Due to the gradient of the stream and stream flow, spawning habitat is limited for a major portion of this section.

Squaw Creek
Wild fish species currently present in Squaw Creek are redband trout, mountain whitefish, long-nose dace, bridgelip and largescale sucker, sculpin, brown and brook trout (introduced), kokanee, and bull trout (lower end). There is potential for sockeye, summer steelhead, and spring chinook if fish passage plans are successful at the Pelton/ Round Butte hydroelectric project.

BLM administered lands along Squaw Creek are in 5 parcels which include 1.2 miles of the creek. Fisheries habitat on the BLM administered lands above Alder Springs are generally fair to poor due to low water flows and high water temperatures. BLM administered lands below Alder Springs are generally good to excellent due to the influence of the numerous springs that supplement the stream flow with cold water.

Little Deschutes River and Crescent Creek
Fish species in the Little Deschutes River and Crescent Creek are redband trout, brown and brook trout (introduced), mountain whitefish, and sculpin. Reasons for the current low numbers of redband and brown trout are unknown at this time, but may be attributed to the high infestations of nematodes found in these fish. On BLM administered lands along these creeks, fisheries habitat conditions are in good to excellent condition with adequate instream cover, healthy riparian areas, and moderate water temperatures to support cold water fish.

Reynolds Pond
Reynolds Pond is one of two ponds in eastern Oregon where redear sunfish have been introduced. Other fish species known or suspected to occur are largemouth bass, brown bullhead, and three spine stickleback. Lack of productivity in Reynolds Pond has created a population of stunted redear sunfish that out compete the largemouth bass. Habitat conditions are poor north of the pond's small islands due to shallow water and lack of cover. This concentrates fish in the southern portion of the pond near the dike making

them vulnerable to fishing pressure. The pond was fertilized in the early to mid 1990s by ODFW to increase productivity. No studies to date have been done to determine the effectiveness of this measure.

Mayfield Pond
Mayfield Pond contains brown bullhead and largemouth bass. It appears that the population is large but the fish are small. Due to the shallowness of the pond, poor fisheries water quality, the potential is quite low to support most fish species.

Endangered Species

Currently there is only one fish on the Endangered Species list and that is bull trout, whish is listed as threatened. The USFWS has proposed that some areas be designated Critical Habitat for this species, including the Crooked River from Prineville to Lake Billy Chinook and the Deschutes River below Steelhead Falls. The BLM will conference/consult with the USFWS on any plan actions that may adversely affect bull trout or their habitat.

Proposed critical habitat includes areas that provide one or more of the following functions (USFWS 2002): (1) spawning, rearing, foraging, or over-wintering habitat to support existing bull trout local populations; (2) movement corridors necessary for maintaining migratory life history forms; and/or (3) suitable and historically occupied habitat that is essential for recovering existing local populations that have declined, or that is needed to reestablish local populations required for recovery. For each stream reach, the lateral extent of critical habitat is the width of the stream channel at its bankfull elevation; adjacent floodplains are not proposed critical habitat (USFWS 2002). However, human activities that occur outside the river channels can have demonstrable effects on physical and biological features of the aquatic environment.

In November 2002, the USFWS released its draft recovery plan containing recommendations for recovering bull trout in the Columbia River Basin. The goal of the draft recovery plan for the Deschutes Recovery Unit is to ensure the long-term persistence of self-sustaining complex interacting groups of bull trout distributed throughout the species native range. The following objectives have been identified in the draft Bull Trout Recovery Plan for the Deschutes Recovery Unit:

- Maintain current distribution of bull trout within the lower Deschutes Core Area and restore distribution in previously occupied areas within the Deschutes Recovery Unit
- Maintain stable or increasing population trends of bull trout
- Restore and maintain suitable habitat conditions for all bull trout life history stages and strategies
- Conserve genetic diversity and provide opportunity for genetic exchange

Water Quantity and Quality

Natural flows to the Deschutes and Crooked River are modified by the operation of five major reservoir systems: Crane Prairie (55,300 af) and Wickiup (200,000 af), both located in the Upper Deschutes River sub-basin; Crescent Lake (91,700 af) in the Little Deschutes subbasin; and Prineville Reservoir (153,000 af) and Ochoco Reservoir (46,500 af) modify flows in the Lower Crooked River sub-basin. The magnitude and frequency of flood events on the Crooked River below Bowman Dam has been reduced since the closure (meaning completion) of the dam in 1960. Prior to the closure of Bowman Dam in 1960, average peak discharges typically ranged from 3,000-7,000 cfs. Following closure, peaks never exceed approximately 3,300 cfs, though the spring runoff in April of 1993 came close with discharge measured at 3,250 cfs (See Figure 3-1).

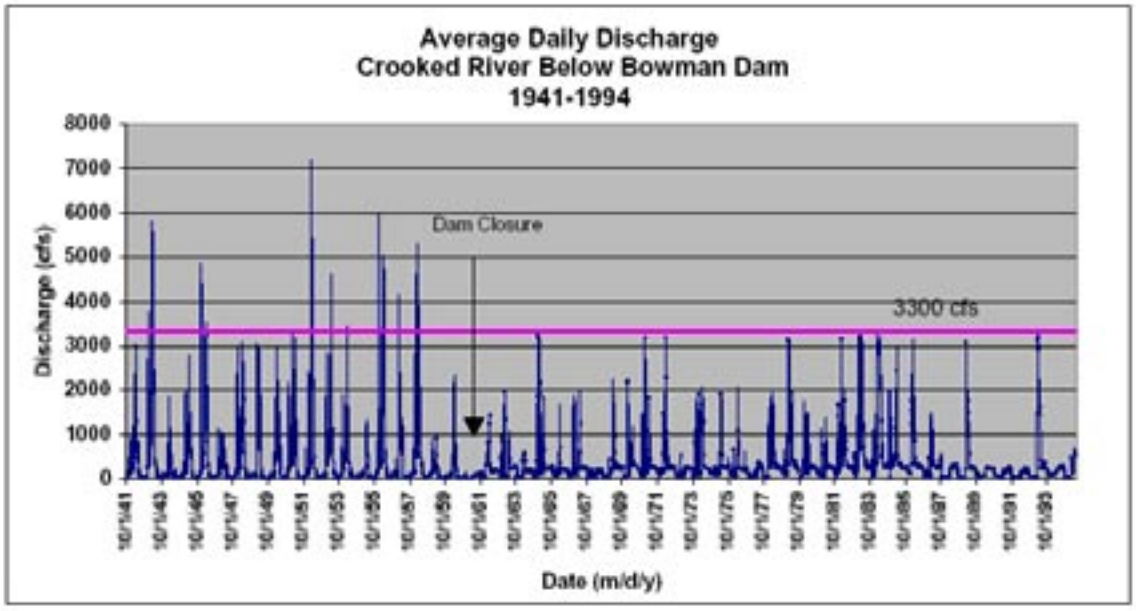

Figure 3-1. Average Daily Discharge, Crooked River below Bowman Dam.

Peak flows that used to occur on average once every 5 years (i.e., 5,000cfs) have not occurred at all since dam closure, which has likely had a significant effect on flood plain and landscape level features. In addition, capture and storage of peak streamflows have effectively increased summer low flows from pre-dam conditions, as well as decreased bankfull flows from approximately 2,200 cfs to 1,200 cfs (see Figure 3-2; and Figure 3-3). Bankfull discharge is considered to be the channel-forming or effective discharge (Leopold, 1994). A decrease in bankfull flows has likely caused the Crooked River to decrease its channel capacity through changes in channel dimension and pattern.

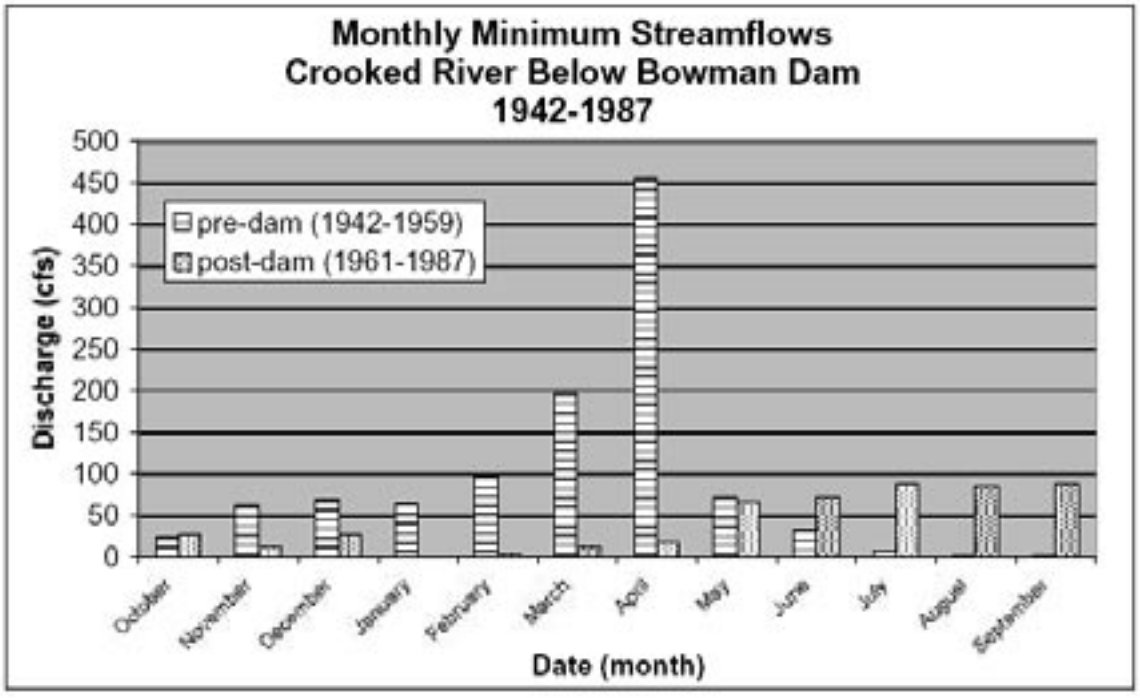

Figure 3-2. Monthly Minimum Stream Flows, Crooked River below Bowman Dam.

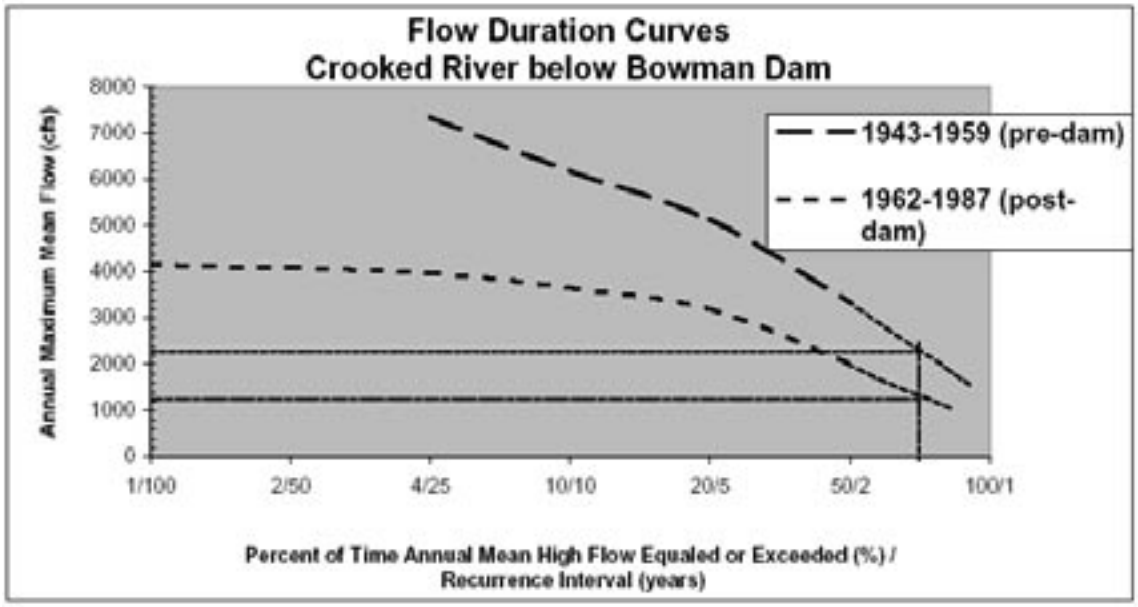

Figure 3-3. Flow Duration Curves, Crooked River below Bowman Dam.

This discharge is sufficiently frequent and sufficiently effective to be most important in forming and maintaining the channel through the erosion and deposition process. Because the Upper Deschutes River is largely spring fed, it historically has a stable hydrologic regime in which fluctuations in water flows are minimal compared to rivers dominated by surface runoff (USFS, 1996). However, streamflows on the Deschutes River have been altered since 1922 by Crane Prairie Reservoir and since 1942 by Wickiup Reservoir. In addition, six irrigation districts divert water near Bend to irrigate 115,000 acres in Jefferson, Crook, and Deschutes counties. Approximately 60 percent of the annual flow measured in the Deschutes River at Benham Falls is diverted for irrigation (Main, 2000). As a result of water storage and diversions for irrigation, the natural, stable flows of the Upper Deschutes River have been replaced by lower flows during winter storage months and higher flows during the summer irrigation season (USDA, Forest Service, 1996). Just outside and to the north of the planning area, the Pelton-Round Butte Hydroelectric Project operates a series of three dams as "modified run of the river". Thus, average daily inflow from the Middle Deschutes, Lower Crooked, and Metolius Rivers to the Pelton-Round Butte Project is approximately equal to the average daily discharge to the Lower Deschutes River.

The planning area includes several naturally occurring ponds and numerous constructed ponds. Most of the naturally occurring ponds are seasonally flooded dry lakebeds which are located primarily in the north. Other perennial ponds are fed by irrigation canal water or are excavated material sites that have intercepted the groundwater table. Stock water ponds constructed in intermittent stream channels or within dry lakebeds acquire water during spring runoff, but are generally seasonal, drying as summer progresses. Stock ponds created in meadows are fed by groundwater and may be seasonal or perennial depending on the location. Many ponds constructed for stockwater receive water from irrigation canals.

Numerous wetland types occur within the planning area, but these areas are currently unmapped or classified electronically for most of the planning area. The USFWS has digitized various wetland types based on their national wetlands inventory (USFWS, 2001). The digital data is available for approximately the western half (47 percent) of the northern planning area. Within the area for which there is data, there are 1,011 acres of wet meadows, no acres of forested wetland, and 500 acres of shrub wetland. Wetlands

are often found along streams, old stream channels, and low lying areas. Narrow strips of wetlands exist along both sides of the Deschutes River, Crooked River, Squaw Creek, McKenzie Canyon Creek, Little Deschutes River, and Crescent Creek. Wetlands created by irrigation water, such as Mayfield and Reynolds Ponds, are human-caused and are not considered federally designated wetlands. These ponds, however, still retain riparian values. Several acres of wetlands occur adjacent to some irrigation canals due to leakage. In the La Pine area, wetlands occur in several areas. Due to the shallow water table, they are more common within the La Pine area than in the remaining planning area.

Hydrologic Units/Aquatics/Riparian

Hydrologic units can be identified according to a system developed by the USGS. This system delineates a hierarchy of geographic regions and their subparts, such as region, subregion, basin, subbasin, watershed, and subwatershed. Each hydrologic division within the hierarchy is called a "field" (see Map S-14, Sub-basins, Watersheds, and Sub-Watersheds). Surface water within the planning area flows within the Middle Columbia subregion of the Pacific Northwest region. The entire planning area is situated within the Deschutes basin. The northern portion of the planning area is located primarily within the Lower Crooked and Upper Deschutes subbasins, while the La Pine area is located mainly within the Little Deschutes sub-basin. The Interior Columbia Basin Ecosystem Management Project (ICBEMP)(USDA and USDI, 2000) has identified six subwatersheds within the planning area as Aquatic A2 subwatersheds (see Map S-14, Sub-basins, Watersheds, and Sub-Watersheds). Four are within the Upper Deschutes sub-basin, and two within the Lower Crooked sub-basin. The A2 subwatersheds are intended to provide a system of core subwatersheds that are the anchor for recovery and viability of widely distributed native fishes. These subwatersheds, located on the Lower Crooked River, Lower Deschutes River, and the Deschutes River immediately downstream of the confluence of Crescent Creek and the Little Deschutes River, were selected due to their strong populations of native redband trout.

The Interior Columbia Basin Ecosystem Management Project identified the Upper Crooked Sub-basin as a high restoration priority subbasin. In addition, the Beaver/South Fork Crooked sub-basin, which lies outside of the planning area, was also identified as a high restoration priority sub-basin. These sub-basins were chosen as high priority for restoration because they have high risk to aquatic and terrestrial species and habitats from natural disturbance, have good opportunity to reduce those risks through restoration activities, and provide employment and economic opportunities in tribal communities.

In 1991, in response to growing concern over the integrity of ecological processes in many riparian and wetland areas, the BLM established national goals and objectives for managing riparian/wetland resources (Riparian-Wetland Initiative for the 1990s). The initiative's goals are to restore and maintain existing riparian/wetland areas so that 75 percent or more are in Proper Functioning Condition (PFC) by 1997, and to provide the widest variety of habitat diversity for wildlife, fish, and watershed protection. Subsequently, the BLM established a definition of PFC and a methodology for its assessment. The BLM has adopted PFC assessment as a standard for evaluating riparian areas and uses this to supplement existing stream channel and riparian evaluations and assessments. Perennial streams and wetlands located on Public land have been assessed for condition using the PFC methodology. The PFC assessment employs a consistent approach for considering hydrology, vegetation, and erosion/deposition (soils) attributes and processes (Prichard, *et al.*, 1998). The assessment of the on-the-ground condition refers to how well the physical processes are functioning.

PFC is defined separately for lotic and lentic waters, as follows.

Lotic waters: (running water habitat, such as rivers, streams, and springs; see BLM Technical Reference 1737-9 and -15) -

Riparian/wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to:
- Dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality;
- Filter sediment, capture bedload, and aid flood plain development;
- Improve floodwater retention and groundwater recharge; develop root masses that stabilize streambanks against cutting action;
- Develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration and temperature necessary for fish production, waterfowl breeding, and other uses; and
- Support greater biodiversity.

Lentic waters: (standing water habitat, such as lakes, ponds, seeps, bogs, and meadows; see BLM Technical Reference 1737-11 and -16) -

Lentic riparian/wetland areas are functioning properly when adequate vegetation, landform, or debris is present to:
- Dissipate energies associated with wind action, wave action, and overland flow from adjacent sites, thereby reducing erosion and improving water quality;
- Filter sediment and aid flood plain development
- Improve flood water retention and groundwater recharge;
- Develop root masses that stabilize islands and shoreline features against cutting action;
- Restrict water percolation;
- Develop diverse ponding characteristics to provide the habitat and water depth, duration, and temperature necessary for fish production, water bird breeding, and other uses; and,
- Support greater biodiversity.

Riparian/wetland areas are classified as functional at-risk when they are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation. These areas are further distinguished based on whether or not they demonstrate an upward, static, or downward trend.

Riparian/wetland areas are classified as nonfunctional when they clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, etc., as listed above. The absence of a particular physical attribute, such as a flood plain, is an indicator of nonfunctioning condition. Riparian/wetland areas are classified as being in unknown condition when the BLM lacks sufficient information to make a determination.

Because the functioning condition of riparian/wetland areas is a result of the interaction between geology, soil, water, and vegetation, the process of assessing whether or not a riparian/wetland area is functioning properly requires an interdisciplinary team, including specialists in vegetation, soils, and hydrology. The team also requires a biologist because of the fish and wildlife values associated with riparian/wetland areas. Because of unique attributes of individual riparian areas, site-specific and on-site assessments are necessary.

Riparian/wetland areas will function properly long before they achieve an advanced ecological status. The range between PFC and an area's biological potential then becomes the "decision space" for social, economic, and other resource considerations. Until PFC is attained, management priorities and options focus on reaching this threshold. Areas that meet PFC will be managed to assure a continuation of this condition, and that progress is being made toward achieving the desired condition. Table 3-8 lists the functional rating for assessed streams, ponds, and wetlands in the planning area.

Table 3-8. Proper Functioning Condition Assessment Ratings

Stream/Pond/Wetland Name	Functional Rating
Stream Name	
Deschutes River	Proper Functioning Condition
Little Deschutes	Proper Functioning Condition
McKenzie Canyon	Proper Functioning Condition
Crescent Creek	Proper Functioning Condition
Pond Name	
Mayfield Pond	Proper Functioning Condition
Reynolds Pond	Proper Functioning Condition
Wetland Name	
Linear Wetland	Functional-At-Risk, Trend Not Apparent
Jackpine Loop	Proper Functioning Condition
Hard to Find	Functional-At-Risk, Trend Not Apparent
La Pine High School	Proper Functioning Condition
Patchy	Proper Functioning Condition
La Pine Airport	Proper Functioning Condition
Round Meadow	Proper Functioning Condition
Carex Wetland	Proper Functioning Condition
Poole Allotment	Proper Functioning Condition
Pipeline Meadow-East	Functional-At-Risk, Downward Trend
Howard Lane	Proper Functioning Condition
Morgart Allotment	Functional-At-Risk, Downward Trend
Boot Creek Headwaters Spring	Functional-At-Risk, Downward Trend

Dominant Hydrologic Processes and Water Quality

Many streams within the planning area are designated as water quality limited according to the Oregon Department of Environmental Quality. Section 303(d) of the Clean Water Act requires that each state develop a list of waterbodies that do not meet water quality standards, (see Map S-14, Sub-basins, Watersheds and 303(d) Listed Streams, and Appendix E, 303(d) Listed Streams by Sub-basin) and delineate the stream segments and listed criteria for all streams within the vicinity of the planning area.

Within the planning area, most of the Deschutes River, Squaw Creek and the majority of the Crooked River are listed for stream temperature, most likely due to reduced streamflows from irrigation withdrawals or regulation from dams. Within the Upper Deschutes/Lower Crooked area, there are approximately 720 miles of canals and laterals that divert water from the Deschutes and Crooked Rivers to more than 160,000 acres of irrigated lands in the basin (Gannett, *et al.*, 2001). Water quality data collected by the DEQ on the Deschutes River at Lower Bridge has documented relatively warm stream temperatures and high levels of biochemical oxygen demand and total phosphates (Cude, 1999). As a result, eutrophication is active from April until October, as evidenced by high pH and dissolved oxygen values. Eutrophication is the process of enrichment of water with nutrients, mainly nitrogen and phosphorous compounds, which results in excessive growth of algae and nuisance aquatic plants. It increases the amount of organic matter in the water and also increases pollution as this matter grows and then

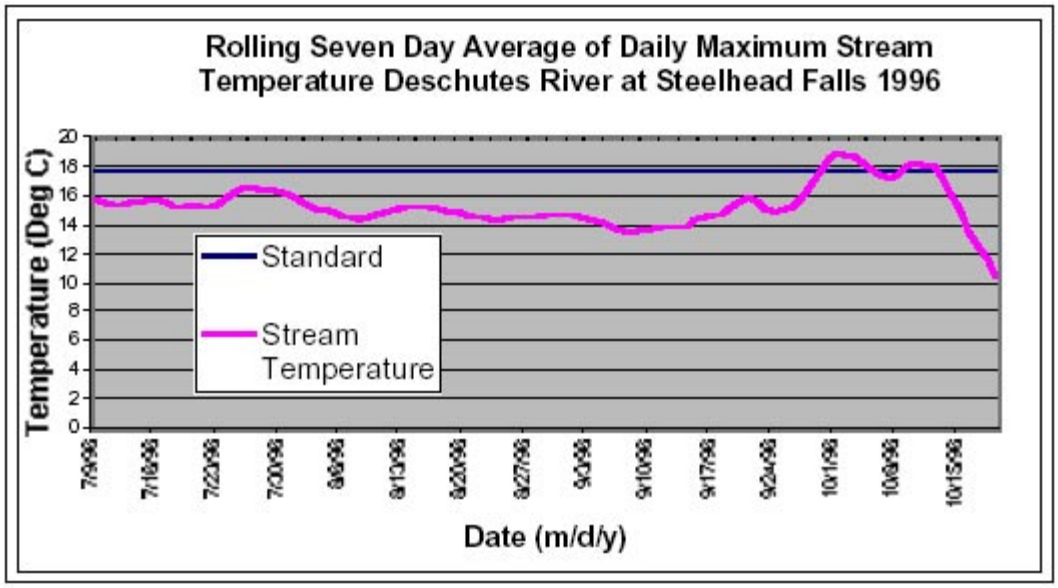

Figure 3-4. Rolling Seven Day Average of Daily Maximum Stream Temperatures, Deschutes River at Steelhead Falls.

decays. However, over the ten year period from 1990-1999, the Lower Bridge site showed a significant improvement in water quality. On the average, the DEQ considers water quality at the Lower Bridge site to be fair in the summer and good in the fall, winter, and spring (Cude, 1999 Annual Report).

Figure 3-4 shows stream temperature data collected by the BLM at Steelhead Falls, located approximately 6 miles downstream from the Lower Bridge site. Data was collected in 1996 and shows the seven-day moving average of the daily maximum in relation to the state standard, which is 17.8°C (64°F). It appears that stream temperatures do not meet the state standard late in the season, when stream-flows are at their lowest and supplemental flows from reservoir releases for irrigation purposes are reduced.

One DEQ monitoring station on the Crooked River at Lone Pine indicates eutrophication is occurring in the river as evidenced by high pH and dissolved oxygen supersaturation. At this site, high water temperatures were detected during the summer months, and high concentrations of biochemical oxygen demand, total phosphates, and total solids were detected throughout the year. Spikes in total phosphate levels, related to heavy precipitation, were also seen at this site. Results of monitoring of the Crooked River at Lone Pine Road indicate elevated levels of fecal coliforms and nitrate and ammonia nitrogen at various times throughout the year. The reduction in water quality at this site is due to land usage including irrigated agriculture that supports confined animal feeding operations (CAFOs) and grazing. These additional impacts lead to a general depression in water quality relative to upstream conditions. However, over the ten year period from 1990-1999, the Lone Pine site showed a significant improvement in water quality. On the average, the DEQ considers water quality of the Crooked River at the Lone Pine site to be poor.

Figure 3-5 depicts stream temperature of the Crooked River approximately four miles below Bowman Dam for the period 1997-1999. Due to the release of cool water from the bottom of Prineville Reservoir, stream temperatures for the three years depicted generally meet the state standard of 17.8°C (64°F). The exception is about a 1-3 day window in 1998 where the standard was exceeded. Downstream from the temperature station, stream temperatures quickly increase due to normal stream heating processes and altered stream channel and riparian vegetation conditions.

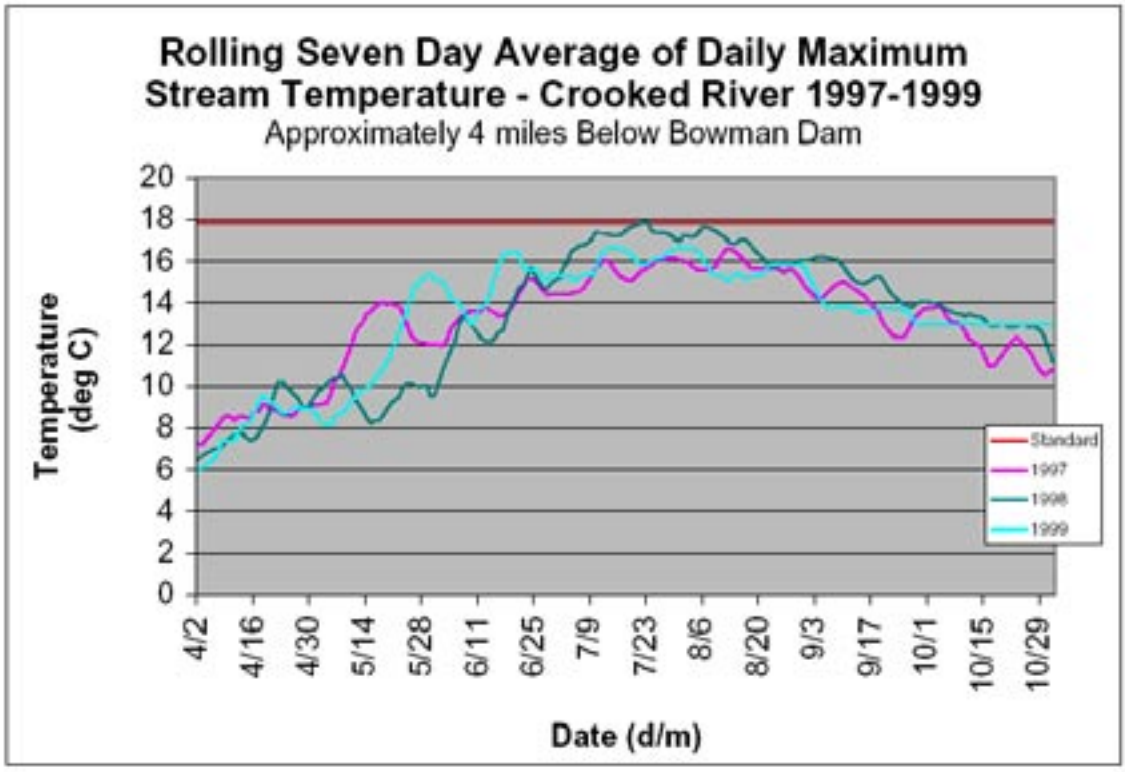

Figure 3-5. Rolling Seven Day Average of Daily Maximum Stream Temperatures, Crooked River.

Within the Little Deschutes sub-basin, stream temperature is the only listed parameter for the Little Deschutes River, Crescent Creek, and Paulina Creek, with the exception that the Little Deschutes River is also listed for dissolved oxygen. However, listings in 2002 will likely include dissolved oxygen as a limiting criterion for the Little Deschutes River (B. Lamb, personal communication). Stream temperature is also a listed criterion for many other streams within the planning area.

Residents of Central Oregon depend on a large supply of groundwater and surface water for human consumption, fish and wildlife habitat, agriculture, industry, and commercial uses. Demands on water resources have increased in Oregon over the past few decades. Although most early water rights were established for irrigation and mining, today's demand includes municipal water supplies, commercial and industrial supplies, and maintenance of adequate stream-flows for fish, recreation, and water quality. Groundwater plays a key role in providing an adequate domestic water supply for the planning area. Virtually all drinking water within the planning area depends on groundwater. Public supply pumpage is concentrated primarily in urban and major resort areas, with scattered, smaller systems in rural areas. In addition, many residents are not connected to public water supplies and rely on private domestic wells (Gannett, *et al.*, 2001). The only watersheds to provide surface water for drinking purposes are Bridge Creek within the Tumalo watershed, which provides drinking water to the city of Bend, and Pole and Upper Squaw Creeks in the Whychus watershed, which provides drinking water to Sisters. There are also thousands of groundwater protection zones currently being delineated for drinking water by the Oregon Health Department. One potable water well located on public land is at Chimney Rock campground. This well is monitored to ensure the State of Oregon's requirements for public water systems are met (OAR 333).

Although there are several developed springs and small reservoirs on BLM-administered lands, currently, there are only two reservoirs with appropriate water rights. All of these water sources were developed primarily for the purpose of domestic livestock watering, with wildlife considered as a secondary benefit.

The principal source of recharge to the groundwater aquifer is precipitation that occurs in the Cascade Range. Approximately 40 to 70 percent of the precipitation in the Cascades infiltrates to the groundwater system and moves toward discharge areas near the confluence of the Deschutes, Crooked, and Metolius Rivers near Lake Billy Chinook (Gannett, *et al*., 2001). Virtually all of the regional groundwater in the Upper Deschutes discharges to the surface in these streams in the vicinity of Lake Billy Chinook. East of the Cascade Range, within the planning area, there is little or no ground-water recharge from precipitation. However, the groundwater is artificially recharged by leaking irrigation canals. In 1994, approximately 46 percent of the total amount of water diverted for irrigation (1,060 ft3/s), leaked through the canal bottoms to become ground water (Gannett, *et al*., 2001).

Since surface water resources are fully appropriated within the Upper Deschutes region, groundwater must supply the water needs for all new development in the planning area (USGS, 1999). Because the ground-water system and streams are hydraulically connected, use of ground water can reduce stream-flow.

The La Pine area is characterized by shallow ground-water and rapidly draining soils. Thousands of lots one-half to one acre in size have on-site septic systems and domestic wells. Between 1982 and 1995, the DEQ has detected nitrate levels as high as 41 mg/l. The US Environmental Protection Agency (EPA) maximum contaminant level for nitrate in public water supplies is 10 mg/l. Consequently, the Deschutes County Environmental Health Division, the DEQ, and the USGS, working in cooperation, are addressing the issue of ground-water contamination from on-site systems in the La Pine region.

Soils

In general, there are five geographic areas within the planning area. The soils in these areas are described below and include 21 general mapping units documented in Upper Deschutes Soil Survey (NRCS, 1992), Crook County Soil Survey, Prineville Soil Survey, and the Brothers Soil Survey.

The La Pine area has cold (cryic soils) very deep (> 60 inches) somewhat excessively drained, loamy coarse sands to a gravelly (pumice) loamy coarse sand formed in ash and pumice over buried alluvial gravelly sandy loam and loam soils.

The Millican area has cool (frigid soils) very deep and deep (> 40 inches) to moderately deep (20 - 40 inches) excessively well to well drained loamy coarse sands, sandy loams formed in ash and pumice over buried alluvial and lacustrine gravelly sandy loam and loam soils, or basalt bedrock in basins and lava plains. In the uplands a moderately deep and shallow (10 - 20 inches) stony sandy loam and loam over varied (skeletal) subsoils, but mainly sandy loams to clay loams over rhyolite and basalt bedrock occurs on the steeper hills, buttes, and mountains.

The Bend, Redmond, Sisters and Culver area has warmer (mesic soils) moderately deep to shallow, well drained loamy coarse sands (southern portion) and sandy loams (northern portion) soils formed in ash and pumice over recent lava (blisters) flows and gravelly loams to sandy loam (Sisters area) soils formed in ash and pumice over alluvial glacial outwash. The very steep canyons of the lower Deschutes and lower Crooked River are exposed rock outcrops with mostly shallow skeletal loams and sandy loams. There are a few isolated upland buttes that have similar soils as those described in the uplands in the Millican area (Cline Buttes, Smith Rock area).

The Powell Buttes area has cool (uplands and north slopes) and warmer (alluvial terraces, fans, lava plains and southern slopes) moderately deep to shallow, non-skeletal and stony or skeletal, well drained sandy loams and gravelly loams over basalt and rhyolite bedrock or duripans (hardpans). The uplands are similar to those described above.

The Prineville area has a mix of low alluvial terraces and floodplains and the uplands to the north, east and south. The low terraces and floodplains are mainly deep to moderately deep well drained, alluvial stratified (gravels) of sandy loams, loams, silty loams and clay loams that are mostly irrigated farmlands. The uplands to the north are the shallow to moderately deep and deep loam well drained and clay loam soils of the rolling foothills to Ochoco National Forest and Grizzly Mountain. The uplands to the south are a mix of deep to shallow well drained gravelly, sandy loams, loams and clay loam soils over clay and skeletal clay loam and loam subsoils. These soils formed in colluvium and residuum from basalt, igneous and sedimentary bedrock with less ash deposition.

Continued development within the planning area may lead to activities that disturb soil surfaces by direct displacement, compaction, removal of protective vegetation and soil biological crusts resulting in increased susceptibility to wind and water erosion. Indiscriminate vehicle use off existing roads is the primary activity of concern.

Prime Farm Land

There are 33 detailed soil mapping units identified as Prime Farm Land in the Upper Deschutes Soil Survey and 27 (draft) detailed soil mapping units are identified as Prime Farm Land in the Crook County Soil Survey (draft) area. These units are usually identified with deeper alluvial soils of stream terraces, flood plains (if drained or protected from flooding) and/or irrigated lands with few restrictions to tillage practices and less than 8 percent slopes. In the urban interface areas almost all of this type of acreage are irrigated lands. In the Upper Deschutes Soil Survey about 10 percent or 168,000 acres of the lands would meet the definition of prime farmland if an adequate and dependable supply of irrigation water were available.

Biological Soil Crusts

Biological soil crusts consist of bacteria, microfungi, cynobacteria (blue-green algae), green algae, bryophytes (short and tall mosses and liverworts) and lichens. The lichens have a symbiotic interrelationship between fungus and algae or cyanobacterium. The main components of these biological crusts are photosynthetic and most are capable of drying out and suspending respiration without negative consequences. They are also capable of almost immediately starting up again upon receiving moisture. They play important roles in soil ecosystem processes (Eldridge and Rosentreter, 1998) including soil stability and soil moisture (Belnap *et al.*, 2001). When mosses and lichens get buried they die (Belnap *et al.*, 2001). When biological soil crusts are disturbed, nutrient cycling especially nitrogen, can result in reductions in soil nitrogen or fixation in the range of 75 to 95 percent on sandy soils. This is a result in changes to species composition, burial, and reduced input and elevated losses (Belnap *et al.*, 2001). They also have direct multi-interactions with vascular plants in cool deserts (frost-heaving) like those in the planning area by "increased perennial vascular seed entrapment, germination, establishment, survival, biomass, and nutritional status" (Belnap and Harper, 1995).

Fire in pre-historic times was the largest agent of change in the sagebrush-steppe and juniper ecosystems outside of extended droughts in the planning area. Generally, the larger (less mosaic) and the more severe the fire the longer it took to re-colonize the area from the adjacent non-burn areas acting as propagules/seed/spore reservoirs. Intense fires today, natural or prescribed, can lead to the dominance of non-native species,

particularly if in the presence of non-native exotics such as cheatgrass. This increase in non-native species composition can lead to increased wildland fire frequency causing a corresponding decrease in species diversity of the soil organic crusts down to just a few species of mosses and cyanobacteria (Kaltenecker, 1997 and Belnap *et al.*, 2001).

In most of the western portion of the planning area the soils are sandy loams or loamy coarse sands, with both stony and non-stony surfaces. Some of the best and most complex biological crusts occur on the stony sandy loams and stony loam surface soils on the northern slopes (frost heaving) or in nearly all cases on the northern aspects of juniper, mountain big sagebrush and bunch grasses and amongst the blister rock outcrops. Usually the least common sites for biological crusts development are those deeper loamy sand or sandy loam areas in the lower depressional areas away from the stony or rocky blister areas. These are the mesic (warmer), deeper loamy coarse sands of the Gosney-Deskamp-Rock Outcrop or the Deschutes -Stukel Rock Outcrop mapping unit that are more susceptible to wind erosion. In the Millican area the soil unit most susceptible to wind erosion is the Stookmoor- Gardone-Borobey mapping unit and to a lesser degree Dester-Beden-Stookmoor mapping units. These are the frigid (cool) sandy loam soils at 4,000 feet or higher elevations with usually mountain big or low sagebrush / Idaho Fescue dominated rangeland communities. The stony clay and clay loam soils, more common in the uplands on the east side of the planning area or the areas north and southeast of Prineville Reservoir and north of Prineville itself, also tend to have increased biological soil crust diversity. This diversity is the result of both increased levels of precipitation at higher (4,000 to 6,000 feet) elevations and frigid (cooler) soil temperatures and where both mountain big sagebrush bunch grass and low sagebrush / Idaho fescue plant communities are dominant.

Fire/Fuels Management

Fire and Fuels Management includes two related concerns: 1) hazardous fuels in the wildland urban interface, and 2) fuels management in fire adapted ecosystems.

The wildland urban interface, that zone where the wildlands meet human communities, describes 21 percent of BLM administered lands within the planning area. There are 13 communities described as a "community at risk" from wildland fire within the planning area, and several others beyond the boundary but directly adjacent. BLM holdings represent 39 percent of the lands within the Wildland Urban Interface (WUI) zone, with private holdings accounting for the remaining 61 percent of that area. The Brothers/La Pine RMP described categories for fire's role. The only change proposed to those existing categories described in Brothers/La Pine RMP is the inclusion of the mapped WUI, with those lands classified as Class 6, high value.

The role of fire in the wildlands beyond the WUI zone is described in terms of fire regimes and condition classes. On BLM administered lands with the planning area boundary, 74 percent of all acres have missed at least one expected fire cycle, but human caused disturbances have been pervasive.

Hazardous Fuels in the Wildland Urban Interface

As part of the population growth in Central Oregon, new neighborhoods and individual homes are being built in lands previously considered wild. That area where the edge of urban development meets the edge of federally managed wildlands is termed the wildland urban interface. This tremendous expansion of the wildland urban interface increases the problem of communities at risk from wildland fire dramatically, as well as adding a source of ignitions that can move onto the BLM administered lands.

Several large fires in the past 20 years have threatened or destroyed homes in or near the planning area. Most notably, the Awbrey Hall Fire of 1990 and the Skeleton Fire of 1996 were both fast moving, destructive wildfires.

A list of communities with the highest risk of negative wildland fire impacts has been complied for the entire United States at the time the National Fire Plan of 2000 was developed. The listing was not complete and several other communities have been added by local fire management officers to present a more thorough inventory of communities in the WUI. There are thirteen communities within the planning area on this list (Table 3-9).

In addition to these communities inside the planning area boundary, there are several Communities directly adjacent to the area, including Bend, Sisters, Cloverdale, and Sunriver.

Within the planning area, the WUI is described as 1.5 miles from the community boundary in forested ecosystems, and 0.5 miles from the boundary in rangeland and woodland ecosystems. While the amount of area that may actually be considered for hazardous fuels management will vary according to individual project and site specific wildland fire potential, this zone is considered a starting point for analysis. Within the planning area, 21 percent of all BLM acres are within a WUI zone as described in Table 3-10. About 61 percent of the WUI zone is owned privately, and 39 percent of the entire WUI zone is managed by BLM.

Central Oregon, with its combination of hot, dry summer weather and routine lightning storms has frequent wildfire ignitions. These lightning fires combined with native

Table 3-9. Communities at Risk from Wildland Fire within the Planning Area

Community	County	Community	County
Cliffs Ranch	Klamath	Prineville	Crook
Crooked River Ranch	Jefferson	Pronghorn	Deschutes
Grizzly	Crook	Redmond	Deschutes
Jasper Point Resort	Crook	Sunforest	Klamath
La Pine	Deschutes	Terrebonne	Deschutes
Little River	Klamath	Tumalo	Deschutes

Table 3-10. Wildland Urban Interface Acres by Ownership and Vegetation Type

	Acres by Ownership			
WUI Zone Width	**BLM**	**Other**	**Private**	**Total**
Forest WUI Acres, 1.5 mile	44,701	119	31,185	76,005
Range WUI Acres, 0.5 mile	39,027	1,558	95,917	136,502
Total	83,727	1,678	127,102	212,507

burning practices to regulate vegetative growth, biomass accumulation, and species composition, and were extremely important in maintaining well-functioning ecosystems. With the human inhabitants in the area today, those frequent ignitions have become a threat where they occur near the population centers.

In the past 20 years, there have been 747 fires involving BLM fire suppression within the planning area. Of those fires, 23 percent were of human origin, and 77 percent were lightning caused. Considering the two planning area blocks separately, there are some interesting differences. In the La Pine area, which has the most fuel and possibly the greatest potential for wildfire involving homes in the wildland urban interface, there have been 62 fires within the planning area boundary in that 20 year period. Only 12 of these were lightning fires, the other 50 were human caused. The largest fire within the planning area in the past 20 years was the 120 acre Pine Forest Fire in the spring of 2001. Many large fires have burned near La Pine on private or National Forest lands, and there is a potential for large fire initiation and spread in this area. The larger northern portion of the planning area has had 685 fires in the past 20 years. Only 19 percent of those were human caused, the other 81 percent caused by lightning.

Fuels Management in Fire Adapted Ecosystems

Ecosystems within the planning area have adapted to periodic disturbance from fire. Over time, vegetative communities have evolved to survive fire. Sustainable ecosystems have adapted to the inherent frequency, size and severity of the natural disturbance cycle. In the planning area, 26 percent of the acres managed by BLM are functioning as expected in terms vegetative structure and fuel loading. The other 74 percent (294,000 acres) of the BLM administered lands within the planning area have missed one or two expected fire cycles due to suppression and other vegetation management choices in past decades and some acres may have missed three or more expected cycles. The vegetative response to this disturbance deficit is a change in species presence or prominence, and fuel quantity and continuity. The Brothers/La Pine RMP recognized fire's role in the ecosystem and established risk classes that provided guidance for fire suppression and fuels treatments.

Other disturbances, such as grazing, road building, timber harvest, and the introduction of weed species have also changed fuels conditions. Some of those changes may be short term, and others more permanent. Those changes have led to an altered fire environment. How much current conditions differ from conditions that would be found in an unmanaged ecosystem is not known.

Decisions on vegetation management for ecosystem health must include a measure of sustainability, including number of disturbance cycles missed and the departure from species composition, structure, and fuel loading found under a properly functioning disturbance regime.

Special Management Areas

Wilderness Study Areas

The Statewide Oregon Wilderness EIS was completed in December 1989, and was followed by the record of decision in October, 1991 titled "Wilderness Study Report." Two Wilderness Study Areas (Badlands WSA and Steelhead Falls WSA) were evaluated, with nearly the entire Badlands WSA being recommended suitable for wilderness designation. Steelhead Falls WSA was not recommended suitable for wilderness designation. Horse Ridge ACEC/ RNA (see ACEC section, below) is also known as the Western Juniper Instant Study Area (ISA) which was evaluated for wilderness designation in Volume II of the Wilderness Study Report. This ISA was determined to

not have wilderness characteristics and was not recommended suitable for designation. However, all three areas are managed under BLM's Interim Guidelines for Lands Under Wilderness Review (BLM, 1995), better known as the Interim Management Policy (IMP), until Congress acts on Oregon BLM's wilderness recommendations. Only Congress can designate Wilderness or release areas from further wilderness review. The total acreage and amount recommended suitable and unsuitable for designation for each WSA or ISA is shown in Table 3-11, Wilderness Study Area acreage, and on Map 7, Special Management Areas.

Motor vehicle access is extremely limited in the Steelhead Falls WSA, due to steep topography of the Deschutes River Canyon and surrounding private lands that block most access. Folley Waters Road and BLM administered lands adjacent to the WSA were closed to vehicle use through an EA in 1997. Several other locations adjacent to the WSA receive occasional unauthorized vehicle use, including off Canary Drive, River Place and Scout Camp Trail.

As the adjacent community of Crooked River Ranch grows, the use on trails within the WSA has increased. Numerous, braided, user created trails exist in the WSA. The trails are rarely maintained, which has resulted in erosion and some public safety issues.

The Western Juniper ISA is managed as the Horse Ridge ACEC/RNA under a management plan implemented in 1996 (see ACECs, below). Management of this area as an ACEC/RNA protects wilderness values since access is limited to foot traffic and any activities that would modify or impact the vegetation communities are prohibited. There is concern as mountain bike use increases in the general area and intrusions into the ISA by trail users have been noted. Field monitoring of this ISA occurs three to four times annually, for both ISA and ACEC purposes.

Wild and Scenic Rivers

Four segments of National Wild and Scenic Rivers include BLM administered lands within the planning area. Management policy for BLM administered lands within these corridors are covered under various Wild and Scenic River Management Plans adopted during the mid-1990s. The BLM administered lands within the Wild and Scenic River corridors are not being assessed in the Upper Deschutes RMP Amendment.

The Wild and Scenic Rivers which include BLM administered lands include the Lower Crooked (Chimney Rock Segment) Wild and Scenic River, the Lower Crooked Wild and Scenic River, the Middle Deschutes Wild and Scenic River, and the Upper Deschutes Wild

Table 3-11. Wilderness Study Area (WSA) Acreage

Wilderness Study Area	Acreage Recommended Suitable	Acreage Not Recommended	Total Acreage
Badlands WSA	32,030	191	32,221
Steelhead Falls WSA	0	3,240	3,240
Western Juniper WSA	0	600	600
Total	32,030	4,031	36,061

and Scenic River. The acreage of these Wild and Scenic River corridors is described in Table 3-12.

The Upper Deschutes River features primarily flatwater boating with limited whitewater and excellent trout fishing opportunities. The Upper Deschutes Wild and Scenic stretch is 54.4 miles, with11 miles classified as "Scenic", and 43.4 miles classified as "Recreation".

The Middle Deschutes Wild and Scenic River is a 20 mile stretch of the river from Odin Falls downstream to the upper end of Lake Billy Chinook. This stretch of river goes through several isolated BLM parcels at the upstream (southern) end of the corridor, then through the Steamboat Rock parcel of BLM administered lands west of Terrebonne, and through BLM and Crooked River National Grasslands BLM administered lands along the western edge of the Crooked River Ranch community.

There are several access points along this stretch of river, however, most access is blocked by private development. The greatest concentration of access points to the river corridor occur from local roads within Crooked River Ranch, although the dense, convoluted road network at the Ranch makes it difficult for visitors to find these access points. None of these access points except for Steelhead Falls Campground are signed or developed. Recreational uses identified in the W&S River plan (BLM, December, 1992, BLM-OR-PT-93-11-1792) include fishing, hiking, backpacking, camping, wildlife and nature observation, expert kayaking and rafting, picnicking, swimming, hunting, and photography. Based on regional and national significance, recreation opportunities available within the river corridor were identified as being outstandingly remarkable.

The Lower Crooked Wild and Scenic River corridor is located on the east side of Crooked River Ranch, and is a 9.8 mile stretch of the river. The same outstandingly remarkable recreation opportunities are identified for this Wild and Scenic River stretch as the Middle Deschutes Wild and Scenic River. Access is almost impossible to this stretch of river, which is bordered mostly by private land and confined by steep canyon walls. Several hazardous trails do provide access to the river, and are generally used only by anglers. The one safe access trail (Hollywood Road) has been closed for several years after a private landowner installed a locked gate at their property line.

The Lower Crooked (Chimney Rock Segment) Wild and Scenic River is an 8-mile river segment located between Bowman Dam (Prineville Reservoir) and the city of Prineville. Unlike the other two Wild and Scenic River segments in the planning area, the Chimney Rock Segment has a road alongside the river for the entire 8-mile stretch. Thus, this

Table 3-12. Wild and Scenic River Acreage by Ownership

Wild and Scenic River	County	DNF	BLM	CRNG	BOR	State	Private
Lower Crooked WSR (Chimney Rock Segment)	Crook	0	2,300	0	220	0	40
Middle Deschutes and Lower Crooked WSR	Deschutes and Jefferson	0	3,645	2,535	0	210	2,915
Upper Deschutes WSR	Deschutes	11,462	79	0	0	1,474*	3,939

*Includes 1,144 acres of land leased by the BLM to the State of Oregon for the La Pine State Park

SOURCE: Upper Deschutes Wild and Scenic River and State Scenic Waterway Comprehensive Plan (1996); Middle Deschutes/Lower Crooked River Wild and Scenic Rivers Management Plan (BLM, 1992); Lower Crooked River Chimney Rock Segment Management Plan and Environmental Assessment (BLM, 1992).

river segment has numerous access points, including 10 campgrounds and 2 day use sites. Outstandingly remarkable values identified for this river segment are similar to those identified for the Middle Deschutes and Lower Crooked Wild and Scenic Rivers, although the Chimney Rock segment also lists vehicle touring. The river corridor is popular for fly-fishing, sightseeing, camping, and to a lesser extent, kayaking. Lower Crooked (Chimney Rock Segment) recent improvements to Reservoir Road and planned paving of Millican Road may lead to increased visitation to the Wild and Scenic River from the Bend area. These road improvements may increase the use of this river corridor for auto touring and bicycling.

Areas of Critical Environmental Concern

Area of Critical Environmental Concern, or ACEC, is a special designation created by Congress in the 1976 Federal Land Policy and Management Act (FLPMA). Under FLPMA, the Secretary of the Interior and the BLM were directed to designate as ACECs: ". . . areas within the BLM administered lands where special management attention is required . . .to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards." There are six ACECs within the planning area (6.5% of BLM administered lands), all of which were designated upon publication of the Brothers/La Pine RMP/ROD in 1989. Table 3-13 lists these areas, their acreage, and the reasons for their designation. Existing ACECs are also shown on Map 7, Special Management Areas.

Badlands ACEC includes 16,684 acres in the heart of the Badlands Wilderness Study Area (WSA), just east of Bend. The area was designated for its primitive recreation opportunities, geologic formations, a prehistoric canyon and pictographs and mature juniper woodland. The area was dual-designated within the WSA to provide long-term management of the WSA core in the event the WSA designation was lifted without wilderness designation.

Table 3-13. Existing Areas of Critical Environmental Concern (ACEC) Within the Planning Area.

ACEC Name	Acres	Special Value
Badlands	16,860	Primitive recreation, juniper woodlands, geology, and pictographs.
Horse Ridge	600	Cell #3 – western juniper/big sagebrush/threadleaf sedge community.
Lower Crooked River	2,830	Recreation, scenery, and fisheries.
Peck's Milkvetch	3,902	Special status plant (Peck's Milkvetch) and critical deer winter range.
Powell Butte	520	Three RNA terrestrial ecosystem cells: Cell #4 – western juniper/big sagebrush/bluebunch wheatgrass; Cell #5 western juniper/big sagebrush/Idaho fescue; and Cell #8 – western juniper/bluebunch wheatgrass.
Wagon Road	160	Remaining segments of historical Huntington Road.
Total BLM Acres	**24,872**	

[1]High Lava Plains Province as published in the Oregon Natural Heritage Plan (NHAC, 1998)

Management direction for the ACEC is consistent with WSA management and prohibits firewood harvest, vehicle use off designated routes, new rights-of-way authorizations and vegetation manipulation. Other uses and management must be consistent with the values for which the area was designated.

Present concerns mainly relate to vehicle use off designated routes and unauthorized motorized vehicle use during seasonal route closure periods (December 1 to April 30). Management actions have included signing, blocking of vehicle routes and increased law enforcement surveillance.

Horse Ridge ACEC has the additional designation of a Research Natural Area (RNA), which occurred in 1967. The National Park Service designated this 609 acre area as a National Natural Landmark (NNL) in 1968. Its 609 acres, on the predominately northeast slope of Horse Ridge, represent cell #3 for the High Lava Plains Province as published in the Oregon Natural Heritage Plan (NHAC, 1998): western juniper/big sagebrush/ threadleaf sedge community.

A management plan for the ACEC was completed in 1996. Specific, ongoing management actions include continuing plant inventory (native and exotic) and monitoring (fence maintenance, use in and adjacent to ACEC). User-created mountain bike trails attests to the increased public recreational use in the planning area. Such disturbance is likely to impact the ACEC through the introduction of noxious weeds and other non-native species.

Horse Ridge ACEC/RNA is also known as the Western Juniper Instant Study Area (ISA), as discussed in the Wilderness Study Area section, above. The restrictive management imposed by the management plan for this ACEC exceeds that required by the Interim Management Policy for Wilderness Study Areas.

Lower Crooked River ACEC encompasses 2,592 acres of canyon land immediately downstream from Bowman Dam, the structure creating Prineville Reservoir. The primary values were associated with its designation as a National Wild and Scenic River by the Omnibus Oregon Wild and Scenic Rivers act of 1988. The RMP specified that restricting OHV use, not allowing firewood cutting, and encouraging prescribed fire would protect the area and by making sure any other authorized activities are compatible with the values of the ACEC.

Since publication of the B/LP RMP/ROD, a formal management plan for the Lower Crooked Wild and Scenic River (Chimney Rock Segment) was prepared in 1992. This plan encompasses the majority of the ACEC and has, in most respects, been implemented with protective measures equal to or, in most cases, more stringent than stipulated for the ACEC.

Most impacts associated with visitor use and recreation are being managed and facilities (including campsites and trails) have been developed. There is still concern related to the effect that an increasing western juniper density is having on the plant community within this ACEC.

Peck's Milkvetch ACEC encompasses 4,073 acres in an area southwest of Cline Buttes, in the Cline Buttes Issue Area. The area was designated for its value as critical deer winter range and as habitat for Peck's milkvetch (Astragalus peckii) a Bureau Sensitive species also listed as Threatened by the State of Oregon. At the time, the ACEC encompassed the entire known range of this plant within the planning area.

Management direction for the ACEC, as provided for in the RMP, has been to restrict or bring into conformance all uses so they are compatible with Peck's milkvetch and

critical deer winter range. Land tenure adjustments and firewood cutting are prohibited outright. Long-term monitoring of Peck's milkvetch has been established.

Increased recreation, including OHV, horseback riding, mountain biking and hiking, is occurring within the ACEC, some of which is not compatible with the management direction. A portion of the ACEC is within a livestock grazing allotment. Several small tracts of private land lie within (but not part of) the ACEC and many of them contain residences. In addition, significant populations of Peck's milkvetch have now been found outside the ACEC and the opportunity exists to enlarge the area.

Powell Butte ACEC also has the additional designation as an RNA. Its 510 acres on the south slope of Powell Butte represents three RNA terrestrial ecosystem cells for the High Lava Plains Province as published in the Oregon Natural Heritage Plan (NHAC, 1998): #4, western juniper/big sagebrush/bluebunch wheatgrass; #5, western juniper/big sagebrush/ Idaho fescue; and #8, western juniper/bluebunch wheatgrass.

Management direction for this ACEC has been to essentially exclude all uses other than casual recreation and research. A management plan for this area needs to be prepared and long-term monitoring initiated. The steepness and distance from water have meant livestock grazing occurs only rarely. A fence is needed to exclude livestock entirely. Subdivision and resort development of adjacent private land may increase the amount of unmanaged public use in the ACEC, potentially resulting in the formation of pedestrian, equestrian and motorized trails which could fragment the existing plant communities and serve as pathways for the establishment of invasive plants.

The Wagon Road ACEC encompasses three small parcels of land totaling 75 acres. Each contains remaining segments of the historic Huntington Road, a major supply route linking The Klamath Agency with The Dalles. A public interpretive trail has been developed on the largest, southernmost segment, in cooperation with the Deschutes County Historical Society and the Oregon Trail Coordinating Council. Other uses of the area, including recreation and livestock grazing, are allowed provided the wagon traces and associated vegetation is not disturbed. The southernmost segment was fenced in an effort to protect the area from OHV use. OHV use is still a concern for the two segments in the north.

Caves

Several caves on BLM administered lands in the planning area receive regular visitation from the public. These caves are lava tube formations, some of which are located east of Bend, adjacent to the Arnold lava tube system in the Deschutes National Forest. Others are isolated lava tube formations or rockshelters scattered throughout the planning area. The public has nominated many of these caves for listing as Significant Caves, under the provisions of the Federal Cave Resources Protection Act (FCRPA) of 1988.

Of the caves nominated for listing, the two that receive the most visitation are Redmond Caves and Pictograph Cave, both located in Deschutes County. Both caves are expected to receive increased visitation as the population of Central Oregon grows. This increased visitation from a variety of recreationists has heightened concerns over cave resources. The development of sport climbing routes in Central Oregon caves beginning in the early 1990s also likely led to increased visitation. Since the early 1990s, a number of climbing routes in different locations have been developed in Pictograph Cave, protected by the placement of approximately 88 bolted anchors. Motor vehicle access to the Pictograph Cave entrances was closed by the BLM in 1990. Concerns over impacts to cultural resources and to bat populations led to a closure to all uses at Pictograph Cave in 1998. Early monitoring by volunteers, BLM, and Deschutes National Forest staff indicated that some violations of the closure were occurring. Monitoring efforts have decreased in

recent years, although Pictograph Cave is still monitored by the Archaeological Society of Central Oregon (ASCO). This closure remains in effect until the UDRMP is implemented.

Redmond Cave has also experienced increased visitation, mostly as a result of its location adjacent to the City of Redmond. Redmond Cave has suffered from many abuses over the past decade, including heavy amounts of graffiti, campfires inside the cave, excavation, human waste, abandoned automobiles, and litter. The cave is often visited by local residents who wish to explore the branched lava tube system however, the cave is also a popular place for parties and the area is often used by the homeless who are living on BLM administered lands near the city.

Since 1998, the City of Redmond has been working to lease the Redmond Cave site from the BLM under the auspices of the Recreation and Public Purposes Act (R&PP). The R&PP Act provides the opportunity to meet local needs through the lease or sale of BLM administered land. The City of Redmond envisions the site as a public park. An environmental assessment (EA) for the R&PP Act lease and subsequent development of the site has not been completed yet. The cave site is also of possible interest as a future administrative site for a proposed combining of Deschutes and Ochoco National Forests.

Land Uses

Livestock grazing

Forage allocation

Livestock grazing is currently administered on 101 allotments in the planning area. About 80 permittees are authorized to graze livestock in these allotments under section 3 and section 15 of the Taylor Grazing Act. Total active preference in these allotments is 22,612 animal unit months (AUMs). Each allotment also has AUMs allocated to wildlife. Allotment boundaries are shown on Map 30, and acres and livestock AUMs for each allotment are shown in Appendix G.

In any given year, total annual authorized use fluctuates, and is generally less than total active preference. Each permittee will use none, all, or a portion of the AUMs available on his or her permit. Using the years 1990, 1995 and 2000, the average authorized use is about 81 percent of active preference, such that actual authorized use is about 18,342 AUMs when active preference is 22,612 AUMs. Reasons for allotments (or portions thereof) not being grazed in any given year vary, and include individual operation fluctuations, rest after wildfire, prescribed fire, drought, and other factors.

An additional 22 allotments with 2,414 AUMs are available per Brothers/La Pine RMP direction, but are currently vacant (no permittees hold permits for them). The Brothers/La Pine RMP also directed that 23,509 acres with 6,800 AUMs in scattered parcels in the La Pine area be added to existing allotments or used to create new allotments, but these areas would need new fences, gates, and water sources prior to livestock turnout (the installation of these developments was previously analyzed in the Brothers/La Pine RMP). The Brothers/La Pine RMP also directed the allocation of an additional 6,800 AUMs deemed available as a result of increased forage production after timber treatments in the La Pine area. These timber-related AUMs have not yet been allocated.

Information specific to each allotment (vacant and otherwise) and scattered acres that are not allotted in La Pine is provided in Appendix G, including acres and livestock AUMs. The additional AUMs available as a result of timber treatments are not shown in the table in Appendix G, as they have not been allocated to a particular allotment or parcel.

Characteristics of livestock grazing allotments in the planning area differ from those in other parts of the Prineville District in several respects. There is a greater percentage of vacant allotments (where permittees have relinquished their permits), which is likely due to the unique pressures of managing livestock in an urban-rangeland interface. Allotments in the planning area are generally small scattered parcels (more than half of the allotments contain less than 1,000 acres of public land). Many are bordered on one or more sides by residentially or resort zoned lands, and recreation is a daily rather than a sporadically occurring activity in the allotments. Many miles of public/private boundary fall in "closed" range (see additional information below under "livestock districts"), further complicating the situation.

Trends

Authorized use has declined approximately 3 percent per year on BLM-administered land in the planning area over the last decade. Use on the Deschutes and Ochoco National Forests (including the CRNG) has declined about 2.6 percent per year since 1995 (personal communication, Byron Cheney and Don Sargent, USFS). The Draft EIS for the Interior Columbia Basin Ecosystem Management Plan estimated a 1 percent reduction per year for the Basin.

Evidence indicates that, as ranchers grow older, more leave the field than enter it. In some rural areas experiencing rapid population growth, base properties (home ranches where herds are kept for part of the year) are being converted to resort or residential developments.

In the recent past, the public was primarily concerned about the ecological effects of grazing. As grazing management and policy have adapted to address these concerns, the criticism has shifted to the economics of grazing livestock on BLM administered lands. Urbanization in Central Oregon has created an increased need for alternative uses of public land (urban expansion, increased recreational activity), and the contribution public land grazing makes to the local economy may be minimal compared to the benefits derived from other uses of the land (Holechek 1991). In some areas, public land may not be able to accommodate all user groups. The BLM has received formal and informal requests from members of the public to end grazing on specific parcels of public land within the planning area, for reasons ranging from economics to ecology to recreation.

One of the BLM's objectives is, "to provide for the sustainability of the western livestock industry and the communities that are dependent upon healthy, productive public rangelands" (43 CFR 4180). This objective reflects a recognition that when ranchers remain in business, the private land "base properties" associated with public land grazing continue to provide open space and wildlife habitat. Public land grazing generates employment and economic activity, and is valued by some for its contribution to local culture, tradition, and sense of place.

Allotment Categorization

All grazing allotments in the planning area have been assigned to a management category (Appendix G). The three categories are improve (I), maintain (M), and custodial (C). There are seven criteria used to make the determination of allotment category (Appendix G). The categorization process is designed to establish allotment priorities so management efforts and funding can be directed to areas of greatest need. The I allotments are usually areas with a potential for resource improvement where the BLM controls enough land to implement changes. The M allotments are usually where satisfactory management exists and major resource conflicts have been resolved. Most C allotments are small unfenced tracts intermingled with larger acreages of non-BLM lands, thus limiting BLM management opportunities.

Allotment Evaluation and Management

Allotment evaluations were completed by the early 1990s for most I and M category allotments in the planning area. During these evaluations, interdisciplinary teams reviewed monitoring information and examined and proposed changes to allotment goals, forage allocation, allotment category, and grazing systems. These goals, forage allocations, allotment categories and grazing systems are shown in Appendix G. The evaluations also proposed new rangeland developments to meet allotment goals. These developments are displayed in Table 13 of the Brothers/La Pine RMP, but they are not included in this plan because they are not planning level decisions, and they would require site-specific NEPA analysis prior to implementation.

In 1997, the Oregon/Washington BLM adopted the Standards for Rangeland Health and Guidelines for Grazing Management (BLM 1997), and incorporated the Standards into existing plans. The Standards meet the intent of 43 CFR 4180 (rangeland health regulations), which contain the objectives to "…promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions…and to provide for the sustainability of the western livestock industry and communities that are dependent upon healthy, productive public rangelands."

The Standards are the basis for assessing and monitoring rangeland conditions and trend. The assessments evaluate the standards and are conducted by an interdisciplinary team with participation from permittees and other interested parties.

Based on 43 CFR 4180, if livestock are a significant causal factor in failure to meet a Standard, as soon as practical but not later than the start of the next grazing season, management will be implemented to ensure that progress is being made toward attainment of the standard(s).(BLM, 1997)

The Prineville District BLM expects to complete rangeland health assessments on all District allotments by 2008. Assessments have been completed on about ten allotments in the planning area as of this printing. Livestock were identified as significant causal factors in the failure to meet one or more Standards on all or a portion of three of these allotments. This was or will be mitigated by a change in season of use, forage allocation level, or grazing intensity, or by discontinuance of livestock grazing in all or a portion of the allotment. Allotment Management Plans (AMPs) are sometimes developed for larger I or M category allotments. An AMP prescribes the manner and extent that livestock grazing is conducted to meet multiple use, sustained yield, economic, and other objectives. A grazing system is generally incorporated into the plan. An AMP is implemented when it is incorporated into the permit and accepted by the permittee, and is operational when supporting range improvements and the grazing system have been initiated.

Livestock Districts

Livestock districts are areas where it is unlawful to allow livestock to run at large (Oregon Revised Statutes 607 and 608). Livestock districts include incorporated cities, plus additional land as designated by the county (see livestock district boundaries on Map 30, Livestock grazing allotment boundaries). Areas outside livestock districts are managed under open range policy. In open range, private landowners are responsible for fencing unwanted livestock off their land, while in livestock districts (also called closed range) livestock owners must contain livestock on their own land. Grazing permittees with allotments in closed range are likely to have higher costs for fence maintenance, and greater liability risk regarding livestock/vehicle collisions. The BLM has no control over the State's livestock district laws, and is not involved in setting district boundaries. The BLM pursues civil and/or criminal penalties for owners whose livestock stray on public

land, regardless of whether that land is in a livestock district or in open range (43 CFR 4140.1).

Minerals

The BLM administers three categories of minerals on BLM administered lands. These categories include:

Locatable Minerals

Locatable minerals are minerals for which mining claims can be located, such as precious and base metals and some non-metallic minerals that are not classified "common variety." Presently, there are 26 mining claims and 4 millsite claims within the planning area and two notices have been filed under the BLM Surface Management Regulations (43 CFR 3809).

The potential for the occurrence of locatable minerals within the central and western parts of the planning area is generally low because of the prevalence of young non-mineralized basalt flows, ash deposits, and other volcanic materials (Map S-20, Locatable Mineral Potential). The exception to this is a small area west of Terrebonne that has a high potential for diatomite. Diatomite was mined a few miles west of Terrebonne in the 1950s and continued until the reserves were depleted (Orr and others, 1992).

The northeastern half of the planning area has a moderate potential for locatable minerals due to small pockets of mineralization in the John Day and Clarno formations. The southeast part of the planning area has a high potential because of known deposits of mercury in the Clarno Formation. Minor amounts of mercury have been produced with prospecting beginning in the late 1920s. By the late 1950s, the US Bureau of Mines had recorded 30 flasks of total mercury production from the Platner and Oronogo mines, though the actual output was probably larger (Brooks, 1963).

Mineral Material Disposal

Common variety mineral materials such as sand, gravel, rock, and cinders may be purchased or acquired by free use permits from the BLM. Most of the planning area has a moderate potential for the occurrence of mineral materials (Map S-21, Mineral Material Potential). The high potential areas are in and around existing mineral material mines. Most of the high potential areas occur in areas with cinder cones, alluvial deposits of sand and gravel and volcanic rock outcrops known to have a sufficient quality for use in asphalt. The Badlands basalt flow also has a high potential for mineral materials in the form of ropy slab lava. However, the collection of slab lava in the Badlands ACEC/WSA would not be allowed in any alternative.

Population growth in Central Oregon has lead to an increasing need for mineral materials to build and maintain roads and highways. Between 2000 and 2025, the population of Deschutes County is expected to increase 96 percent from 117,688 to 231,220 people (Deschutes County 2003). The forecasted average annual demand for aggregate in Deschutes County is 1.15 million cubic yards between 2002 and 2010 with an increase to an average of 1.21 million cubic yards annually between 2011 and 2020 (DOGAMI, 1995).

According to studies by ODOT (1998), existing aggregate sources on BLM administered lands are not sufficient for ODOT to consistently offer a public source to project bidders in the Bend/Sisters/Redmond area. When ODOT is not able to offer a public aggregate source, bidding is restricted to firms that have access to private sources, resulting in less competition and increased project costs. In an effort to secure additional aggregate sources on public land and increase bidder competition, ODOT conducted exploratory

work on BLM-administered land and identified several sites for potential development. In response to public input during the site identification process, ODOT deferred formal application for any new mineral material sites until completion of the UDRMP.

Although ODOT has expressed the most interest in developing mineral material sites on BLM-administered lands, road projects account for only 30 percent of the aggregate demand in Deschutes County (DOGAMI, 1995). Local governments and private construction firms may increasingly look to BLM-administered lands for aggregate sources during the life of this plan.

There are currently 20 mineral material sites on BLM-administered lands within the planning area. Over the past 10 years, nearly 1 million cubic yards of sand, gravel, and rock have been produced from quarries and pits in the planning area for construction and maintenance of county roads and state highways. During the same period of time, cinder production varied from 200 to 1,000 cubic yards per year, mostly for sanding roads during the winter months. Sales of sand, gravel and cinders to private individuals averaged 2,500 cubic yards per year during this time period. Theft of slab lava (a decorative stone) has been a problem in the Cline Buttes area for many years. Over the past 5-8 years, the demand for decorative stone has gone from a few tons per year to several hundred tons per year and is expected to increase further.

Mineral Leasing

Fluid mineral resources including oil, gas, and geothermal and some solid mineral resources such as coal and oil shale are obtained from the BLM-administered lands by leasing. The oil and gas potential in the central and western parts of the planning area is low whereas the eastern part (Clarno and John Day Formations) has a moderate potential due to the discovery of oil and gas where these formations crop out northeast of the planning area near the John Day River (Map S-18, Oil and Gas Potential).

Owing to the prevalence of volcanic and volcaniclastic sedimentary rocks in the planning area, coal, coal bed methane, oil shale and tar sands are considered to be absent from the planning area and are not addressed.

Most of the planning area has a moderate potential for geothermal resources because of the geologically recent volcanism, except in the area around Powell Buttes which has a high potential (Map S-19, Geothermal Potential). There is a geothermal anomaly in the vicinity of Powell Buttes (Brown, *et al.*, 1980). Their work indicates a potential for boiling-temperature fluids at a depth of about 1000 meters and more work is required to prove the existence of an economically viable geothermal system.

No areas within the planning area are leased and no exploration is occurring. This situation could change as technology improves or if energy prices rise notably.

Restrictions

BLM-administered lands are generally open to mineral exploration and development under 43 CFR 3000-3800. However, some lands are closed or withdrawn from some or all mining uses and are known as "exclusion" areas. Closures to mineral leasing and mineral material disposal fall under two categories, discretionary and nondiscretionary. Discretionary closures are management-level decisions to close lands to mineral leasing and disposal whereas nondiscretionary closures are formal withdrawals by Congress or the Secretary of the Interior. Withdrawals of land from locatable mineral entry can only occur through nondiscretionary actions.

Discretionary closures may apply in ACECs, RNAs, WSAs, and where mining is incompatible with other management objectives or land uses. Nondiscretionary closures

occur in wilderness areas or areas withdrawn for other purposes. WSAs are non-discretionally withdrawn from mineral leasing (43 CFR Subparts 3100.0-3 and 3201.11) but are open to locatable mineral entry with restrictions to prevent impairment of the suitability for inclusion in the Wilderness System (43 CFR Subparts 3802.1-5).

On lands open to mineral development and exploration, additional restrictions may apply to protect natural resources and mitigate conflicts with management objectives and other land uses. Such restrictions apply in "avoidance" areas including ACECs, WSAs, and RNAs not listed as closed to mineral operations. Restrictions may also apply to protect visual resources, significant archeological sites, wildlife, and habitat components. All applicable restrictions will be attached to mining notices, plans of operations, leases, permits, and contracts.

Some areas are closed to "surface occupancy" for fluid mineral leasing operations. Under this type of restriction, drilling to explore, test, or produce fluid mineral resources may not occur. However, mineral leasing may still occur, provided that the operator slant drills to the resource from an adjacent area where surface occupancy is allowed.

Oregon Military Department Use

The United States Army, including the Oregon Army National Guard, has trained on BLM administered lands in Central Oregon since World War II. The existing BIAK Training Center is centrally located for all National Guard Units within the State of Oregon and is the only desert training site in Oregon. The current Training Center boundary is displayed in Map 35. The existing training area encompasses an estimated 29,744 acres of BLM administered lands under permit from the BLM. Under this cooperative arrangement, the Oregon National Guard does not have exclusive use of the range except for a core area withdrawn from public use.

The BIAK Training Center serves as a maneuver-training center for Cavalry, Engineer, and Infantry units within the Oregon Army National Guard. Engineering units of the Navy and Marine Corps Reserve also train at the BIAK Training Center and perform engineering and construction activities in support of the Army National Guard. Individual military units, either troops, companies, or detachments, generally range in size from 60 to 120 personnel. Most of these units use rubber tired off highway capable tactical vehicles like the HMMWV (Humvee). The Army National Guard's combat engineer units use the tracked armored personnel carrier and there is only one troop of heavy cavalry, equipped with the Abrams tank and Bradley Fighting Vehicle that uses the BIAK Training Center.

The mean number of training days for the five-year period (1997 through 2001) is 11,092 man-days per year (Figure 3-6). A man-day of training is defined as one soldier per day

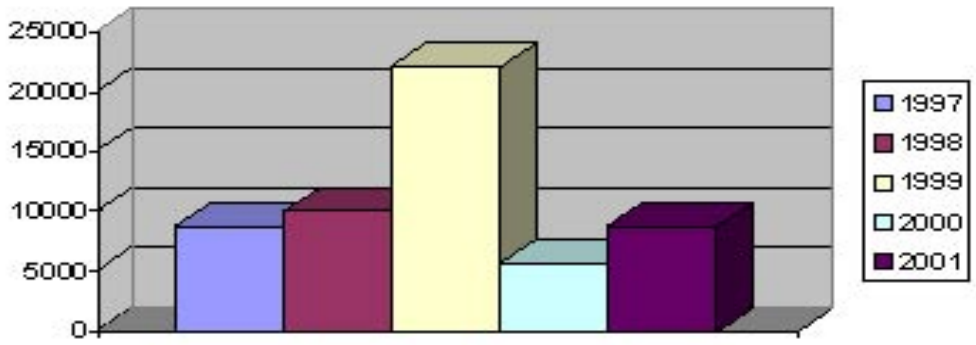

Figure 3-6. Military man-days of training per year on BIAK Training Center.

for training. The five year data for the BIAK Training Center is skewed by a high value of 22,189 man-days of training in 1999. Current training plans for Training Year 2002 project that usage for this year will again exceed 20,000 man-days. While use of the Training Center is expected to remain cyclical, the average annual training usage for the BIAK Training Center is expected to range around 12,000 man-days per year in the future.

Training activities at the BIAK Training Center exhibits an annual pattern. Currently the pattern consists of individual task training requirements in the fall. During this period units may bivouac on the Training Center, but training is usually confined to developed ranges such as the 25m rifle range and little maneuver training occurs. December is traditionally a time of home station training for military units and training rarely occurs at BIAK during that month. Units usually start their crew or collective training in January and such use increases to three weekends per month towards May. In June, field-training activities at the Training Center usually decrease as units prepare for deployment for their summer two-week annual training exercise, usually in late June and July.

Depending on available funding levels, training requirements, and scheduling at other military training centers, the BIAK Training Center may or may not be a location for significant two-week annual training exercises. Historically, Oregon National Guard units use major training areas that allow for live fire exercises for annual training and consequently most units train go out of state to training areas like Yakima Training Center, Washington, or Orchards Training Area, Idaho. Due to the lack of live fire training ranges and high wildland fire risk, the BIAK Training Center does not normally host significant training activities in July and August. In September, training activity at the Training Center again rises to two or three weekends during the month as military units close out the training year and start preparations for the fall training cycle to begin again.

Training Restrictions

Under the Use Permit issued by the BLM use of live ammunition is not permitted and there are other restrictions on the use of ordnance. There are also restrictions on use of vehicles, excavation activity, and uses near private property.

Rehabilitation

The Oregon Military Department spent $20,000 on road improvements and gravel during summer 2002, before the training in July. In the fall/winter of 2002, $21,190 in native grass seed was spread and the Youth Challenge Program hand crew spent 5 days doing rehabilitation work in the training areas. More road maintenance and rehabilitation work is expected during spring 2003.

Forest Products

Timber

Timber production from BLM administered lands in the planning area is relatively minor. Timber supply in Central Oregon is still primarily from National Forest lands, although sale offerings from National Forest lands have steadily declined since a peak was reached in the mid-1980s. Large industrial timber suppliers in Central Oregon include Crown Pacific LLC, which owns large timber tracts south of La Pine and northwest of Bend; and U.S. Timberlands Services, which owns a large tract just west of the Ochoco National Forest.

Timber contributes to local and regional economies by providing jobs and generating revenue. Direct economic benefits are in the form of employment from logging and

manufacturing of the raw resource. A variety of indirect benefits are generated from production of value-added products and the need for supporting goods and services. The BLM allocates 4 percent of Public Domain gross timber receipts to state governments which then re-allocates to county governments for use in building and maintaining roads and schools. Also, a state-administered forest products harvest tax is collected from all public and private timber harvest in the state of Oregon. The current rate is $3.19/MBF. This tax helps fund state forestry programs such as firefighting, fire prevention, research, and administration of the Oregon Forest Practices Act.

On BLM-administered lands in the La Pine portion of the planning area, 40,134 acres of lodgepole and ponderosa pine are classified as commercial forestland (see Map 1, UDRMP Planning Area). This includes 1,826 acres of commercial forestland managed by the BLM within the La Pine State Park. Commercial forestland is defined as forestland that is producing, or has the capability of producing, at least 20 cubic feet of wood per acre per year of a commercial tree species. BLM commercial forestland in the La Pine portion of the planning area represents 2.4 percent and 1.1 percent of the total commercial forestland base in Deschutes County and Klamath County, respectively.

A timber inventory for the La Pine block, conducted in 1982, identified a sustained yield and allowable sale quantity (ASQ) of 3.3 MMBF/year. However, due to the extensive beetle-caused mortality, the 1989 Brothers/La Pine RMP called for an accelerated harvest program, harvesting up to 14 MMBF annually. This program had four primary objectives: 1) reduction of extreme fire hazard; 2) salvage of dead and dying timber; 3) successful reforestation; and 4) increase subsequent growth of commercial tree species. Since the inception of this treatment program, the La Pine area has become the focus of timber management for the District.

Between 1991 and 2001 timber harvested from BLM-administered lands in Deschutes and Klamath Counties ranged from a high of 27.4 MMBF in 1991 to no harvest in 1997 and 1999. In 1992 the harvest was 16.2 MMBF and in 2002 the harvest was only 0.2 MMBF. These numbers reflect the accelerated harvest of the early 1990s and sharp decline in the last few years as most of the available salvage was completed.

The silvicultural prescription applied was primarily seed tree cut with a minor amount of commercial thinning and shelterwood cuts. The treatment objectives have been achieved to varying degrees, although each of the original objectives remains as concerns in certain areas. Beyond the accelerated harvest program, current Brothers/La Pine RMP direction is to apply future timber management based on the "productive capacity of the land."

Prior to the early 1980s, timber harvest in the La Pine area was light and infrequent. Harvest of the larger ponderosa and lodgepole pine occurred with individual tree selection as the primary harvest method. Harvest records for this time period are incomplete.

In the northern portion of the planning area, 1,080 acres are classified as commercial forestland. These are low-elevation, dry-site ponderosa pine stands, located just to the east of the Deschutes National Forest, in the Tumalo, Fremont Canyon and Squaw Creek areas. There are also small stands of commercial forestland located on Grizzly Mountain and east toward the Ochoco National Forest.

The amount of the Brothers portion ASQ for the northern area is approximately 87 MBF per year. Commercial forestland in the northern area represents a small fraction of one percent of the total commercial forestland base in Deschutes and Crook Counties.

The northern portion of the planning area has received limited commercial harvest during the last 50 years and no commercial harvest in the last 20 years. The harvest that did occur was generally a broad-area selection harvest of the larger diameter

ponderosa pine with the objectives of salvage and harvest of mature trees. This practice fit the general silvicultural goal of public land forest management of that era: to remove mature and over-mature trees and to open up the stand to increase the growth of smaller understory trees. This prescription was applied to facilitate the eventual conversion of slower growing old -growth stands to younger, more productive stands.

Presently, juniper in Central Oregon is not being used consistently as a timber resource. Juniper's small size, poor form, defect, and handling difficulties are such that currently its use for conventional forest products is not economically feasible. However, juniper has attained a local niche market for a few specialty products such as paneling, flooring, and house logs. Testing and research continues in the areas of harvesting, milling, drying, and manufacturing for a variety of timber products. Refinements in processing juniper and other economic factors may lead to an increase in future demand for this resource.

Harvest and processing of timber and other wood products is still a major source of income in Central Oregon, but is declining in relative economic importance. Traditional timber sales on BLM-administered lands within the planning area are expected to be very minor for the next few decades until La Pine timber stands regenerate and grow to commercial size. However, noncommercial forest management for fuels reduction and ecosystem health are expected to increase. Treatments such as small tree thinning, pruning, brush cutting/mowing, and prescribed burning would be accomplished through contracted services or BLM personnel.

Biomass

Although there has not been a high local demand for biomass fuels, there is substantial future potential to generate this type of wood product in the planning area. Biomass, in this context, refers to woody residue produced (by grinding or chipping) from timber harvest (slash) or milling by-product (slabs, ends) or from material generated from other forest or woodland ecosystem or fuels reduction treatments (small trees). Biomass is usually used as a fuel for generating electricity or producing steam for direct heating, but can be used for other purposes too.

With the current emphasis on restoration and fuels reduction, the planning area could produce approximately 3-10 green tons per acre as a by-product of these treatments. The material would come primarily from small diameter thinnings in the lodgepole forest of the La Pine area or from juniper reduction in the woodlands of the northern area. This material could either be sold through a conventional timber sale or its value could be used to help off-set some of the contract cost of treatments. The economic feasibility of harvesting this material is questionable. Biomass would compete with other potential products such as paper chips, firewood, post, and poles, etc. Due to economic and environmental factors, an estimated 90% of the lodgepole treatment area in La Pine could be made available and an estimated 30% of the juniper treatment area in the woodlands could be made available for biomass production. In wildland-urban interface areas, removal of small diameter woody material may be required in order to reduce fire hazard and smoke concerns.

Firewood

Public firewood cutting continues to be a popular traditional use of public land in the planning area. For the period 1996-2000, the average annual harvest of firewood from the planning area was 1,062 cords.

The La Pine area, in particular, has received heavy use since the beginning of the beetle outbreak in the late 1970s. At that time, BLM began a personal-use firewood program in the La Pine Block to reduce the fire hazard and to help supply the local demand for firewood. Beetle-killed trees are still available for firewood, however, the amount of this

resource is diminishing due to heavy use, decay, and resource concerns.

The juniper woodlands in the northern portion of the planning area also have been a traditional source of juniper firewood for the public for many years. The area west of the Powell Butte Highway and north of Alfalfa Market Road has been used heavily by the public, mostly Bend residents, since 1982. Beginning in 1995, the traditional use areas near Bend were closed and new areas were designated several miles to the east. Closing of the traditional areas was done for two reasons: increasing awareness of old-growth values and recreation/aesthetic considerations. Public use of new juniper woodcutting areas designated near Millican Road and State Route 27 has been much reduced (less than 200 cords per year) due to smaller diameter trees and greater distance from Bend and Redmond.

Most of the firewood from public land is now sold through the Central Oregon Initiative Interagency Firewood Program. Firewood permits for the Deschutes and Ochoco National Forests and BLM Prineville District currently sell for $10 per cord with a maximum purchase of eight cords per household. Commercial firewood permits are also sold by the BLM on a limited basis; usually to achieve resource objectives such as post-timber sale fuels reduction, ROW corridor salvage, or thinning for forest or rangeland health.

Economic benefits of woodcutting are realized by local communities through sale of such items as chainsaws, gas, oil, and accessories. Commercial firewood sales provide some minor employment and a firewood commodity. A small percentage (4 percent) of BLM firewood sales goes to county budgets for roads and schools. The Prineville District BLM retains 20 percent of receipts for use in BLM road maintenance and resource management.

Despite the population growth, local public demand for firewood appears to be stable or declining slightly in recent years. This trend is due, in part, to an increase in use of highly efficient heating systems such as natural gas appliances and heat pumps. Old, inefficient wood stoves are also gradually being phased out and replaced by more efficient, certified stoves. The phase-out of old stoves was prompted by a 1988 Oregon law restricting wood stove sales to cleaner-burning certified units and a subsequent 1995 Bend city ordinance requiring removal of non-certified stoves upon sale of a home.

Special Forest and Range Products

Permits are issued for a variety of other vegetative products harvested from the forest, woodlands and rangelands within the planning area. Some of these products include: posts, poles, juniper boughs, juniper berries, hobby/furniture wood, lichen, tree and shrub transplants, and pine cones. Of these, permits for juniper boughs are the most common. Most of the permits to harvest juniper boughs are sold to large commercial operators. The boughs are used to make Christmas wreaths, which are then sold at retail throughout the country. Annual harvest of juniper boughs fluctuates with the berry crop. In the period 1996-2000, an average of 170,112 pounds of juniper boughs were sold on the BLM Prineville District. Of this total, an estimated 75 percent came from within the planning area.

Demand for forest and range vegetative products is increasing in direct proportion to the local population increase. Permits for landscaping products (i.e. snags, tree and shrub transplants) are increasing as the use of xeric plants and natural materials becomes more popular. The economic benefits of vegetative material sales comes mostly from the commercial harvest of juniper boughs and a few other materials used to make medicinal products, furniture, and craft items, which are then sold at wholesale and retail outlets.

Visual Resources

Visual resources are the combination of land, water, vegetation, structures and other features that make up the scenery on BLM administered lands. While the high peaks of the Cascades are the most dominant visual element in the planning area, BLM administered lands do possess important visual elements, in large part because they provide an open space view from residences throughout the planning area. Key visual elements of the planning area include landforms that provide both a backdrop to views, and in some cases, home-site locations with panoramic views. These include Cline Buttes, Powell Buttes, Horse Ridge, the Smith Rock area, and West Buttes. River canyons such as the Crooked and Deschutes River, Squaw Creek, and several dry river canyons with dramatic cliff faces are also key visual elements that are sought out for recreational use as well as for home-sites. In addition to these larger elements, many other features are valued for their scenic quality. These elements include old growth juniper stands, clearings in juniper stands that allow for long-distance views, wildlife viewing opportunities throughout the area, ranch or agricultural lands, and historical features.

A portion of State Route 27, adjacent to the Crooked River, was designated as a BLM National Backcountry Byway in 1988. The other State Scenic Highways in the area consist of various routes in the cascades, including one loop west of Sisters and another southwest of Bend. Many other state and county roads in the area are identified as scenic tour routes by a variety of sources, including tourism boards, chambers of commerce, or recreational guides.

In rapidly growing Central Oregon, visual resource concerns are being voiced by many citizens concerned about highly visible developments, including buildings, cell phone towers, and golf driving ranges. In many of these cases, area residents' concerns are about the level of contrast of these new developments and the views they detract from or block. These same concerns have been expressed for a number of proposed projects on BLM administered lands, and will likely continue to be concerns in the future.

Recreation

The BLM has traditionally managed recreation to provide a primitive and dispersed recreation experience, consistent with the large, wide-open landscapes that BLM manages. The planning area includes this traditional BLM recreation setting offered by BLM administered lands situated further from the cities of Bend, Redmond, and Prineville. However, the planning area also includes BLM administered lands located within and adjacent to these rapidly growing cities. These "urban interface" lands are currently accessible from a variety of State Highways, County Roads, local roads, and directly from subdivisions and private property.

With the exception of the Lower Crooked WSR corridor, there are few developed recreation opportunities on BLM administered lands in the planning area. Special Management Areas that attract specific recreation uses include: 1) Badlands WSA, 2) Steelhead Falls WSA, 3) Lower Crooked River WSR, 4) Middle Deschutes WSR, and 5) the Millican Valley OHV area.

Because of the wide variety of recreational opportunities that BLM administered lands provide, these lands receive daily visitation, not only from local residents, but from other areas of the state, as well as out of state. For example, while nearly all visitors to the small, isolated BLM parcels west of Redmond are nearby residents, visitors from Eugene, Portland, and other areas of the Pacific Northwest may visit the Millican Valley OHV system or the Badlands WSA. Climbing opportunities on BLM administered lands

adjacent to Smith Rock State Park attract out-of-state and international visitors.

Community Recreation Demand

Most of the BLM-administered lands within the planning area are located in close proximity to the rapidly growing cities of Bend, Redmond, Sisters, and Prineville as well as the large unincorporated communities of La Pine and Crooked River Ranch. As cited in the 1994 - 1999 Oregon Statewide Comprehensive Outdoor Recreation Plan (SCORP), the lack of time and distance from recreational resources were frequently cited as barriers, especially among younger households with children. For local recreation participation, there is an inverse relationship between frequency of participation and distance to facilities. As distance to facilities increases, participation declines.

The location of BLM administered lands in the urban core reflects a need to consider different types of recreational opportunities than those typically found on larger blocks of public land further removed from urban development. These lands may increasingly be used for local or community activities such as walking, running, picnicking, bicycling, and various sports and games, etc. Few of these activities are supported by BLM management or facility development in the urban interface area. Some of these activities, such as trail use, depend on the large blocks of public land in the urban interface. Other activities, such as historical interpretation, depend on the cultural and historic resources found on BLM-administered lands.

Developed Recreation

The planning area contains relatively few developed recreation sites on BLM administered lands. Nearly all BLM sites are campgrounds along the Lower Crooked River and the Chimney Rock Segment WSR Corridor between Prineville and Prineville Reservoir. The remaining BLM recreation sites are staging areas at the Millican and Rosland OHV areas, primitive campgrounds, such as Steelhead Falls Campground on the Deschutes River, or picnic areas, such as Reynolds and Mayfield Ponds east of Bend.

Reynolds and Mayfield Ponds receive regular visitation from the public. Reynolds pond supports a better fishery, is in better condition and has more picnic tables than Mayfield Pond, and therefore receives more visits. Reynolds Pond is located on the perimeter of the Badlands WSA.

While Reynolds Pond was created to provide a recreation opportunity, Mayfield Pond is created as a result of irrigation canal overflow and has historically been used as a water source for cattle grazing. The pond has been fenced to eliminate mud-bogging by four-wheel drive vehicles, however, the fence typically gets cut several times a year. Mud-bogging and cattle grazing has limited the growth of riparian vegetation at the pond. Although Mayfield Pond is used for fishing and picnicking, other popular uses include target shooting, hunting, and dog training. Both ponds are popular sites for horseback riders, and both sites receive evening use, including late night parties.

These undeveloped sites do not have running water, paving or maintained roads. A few of these sites (Rosland OHV play area, ODOT Pit OHV play area and Steelhead Falls campground) have portable toilets. Many of these sites are difficult to access, some are located in residential areas, and few, if any, have directional signs or improved or designated parking areas.

No sites have been designed or maintained for group use, RV camping, picnicking, or day use activities on BLM-administered lands in the planning area. For the most part, camping and picnic areas or other developed recreation opportunities are provided by National Forest facilities, State Parks, or Bend Metro Park District areas. With the rapid

population growth in Central Oregon, many communities are finding a shortage of developed parks for picnicking, trail use, and for sports. As Central Oregon continues to grow, the demand for recreation sites, for a variety of recreation opportunities, and access to outdoor recreation opportunities due to distance and poor public transportation will continue. Communities have expressed desires to use BLM-administered lands to develop park facilities. In addition, BLM has received requests for Special Recreation Permits to accommodate a wide variety of group uses, including outdoor concerts and large group camps. These permit requests are difficult to accommodate due to the lack of designated or developed sites.

Motorized Recreation Use

The generally flat terrain and open juniper forest vegetation throughout the planning area allows for relatively easy access for motor vehicles. The BLM administered lands in the planning area have been historically used for a variety of motorized recreation, including OHV trail riding, four-wheel drive use, hunting, and sightseeing. This use has included a variety of organized group events, including motorcycle and four wheel drive vehicle races and hill-climbs.

With the exception of a few select parcels, such as the BLM-administered lands adjacent to Smith Rock State Park, or the isolated Airport Allotment parcel at the Dodds Road/ Alfalfa Market Road intersection, and certain smaller urban interface parcels, all BLM administered lands in the planning area are currently either designated as Limited (travel limited to existing or designated routes, or limited seasonally) or Open (cross-country motorized vehicle travel permitted). These lands include the Millican Valley area, lands east of U.S. Highway 97 between Bend and Redmond, the Cline Buttes area, and the Steamboat Rock area west of U.S. Highway 97 between Redmond and Crooked River Ranch.

OHV Use

Most OHV use occurs in the fall, winter, and early spring, when trail conditions favor riding. During the summertime, riding opportunities on most of the BLM-administered lands are restricted by the softness of trails and the dusty riding conditions. OHV use occurs from both local and out-of-area visitors. Many recreationists travel from communities on the west side of the Cascades to participate in OHV activities, partly because Central Oregon offers riding opportunities when areas in western Oregon and Washington are too muddy for OHV use.

There has been an increase in quad (Class I) use in Central Oregon (personal conversation, Dick Duford 202). This may be part of a larger demographic trend of more recreationists aging, and possibly reflects more family use.

Millican Valley is the only designated OHV system on BLM-administered lands within the planning area (although several designated play areas also exist). Many other non-designated areas are popular for OHV use, including the Cline Buttes area, the Steamboat Rock area, and lands immediately east of Redmond. In addition to BLM-administered lands, several other designated OHV areas exist in Central Oregon. These include the East Fort rock Trail System (DNF), Henderson Flat Trail System (CRNG), and the smaller Edison Butte and Green Mountain Trail Systems. Each of these OHV areas is different, and the differences in season of use, vegetation, topography, and views offer recreationists a variety of riding options. Winter riding opportunities are somewhat limited. Areas, like East Fort Rock, are often closed due to snow depth, while others areas (e.g., North Millican and South Millican) are seasonally closed to minimize impacts to deer. This has led to increased use at areas such as Cline Buttes as OHV enthusiasts

seek a place to ride relatively close to town.

The current designated and maintained OHV riding areas in Central Oregon are shown on Map 8, Travel Management Areas. The Christmas Valley area (located on BLM Lakeview District lands to the southeast of Bend) is the only place in Central Oregon that has dunes, and therefore is another attraction for both area and out-of-area recreationists. Generally, people who visit Christmas Valley don't visit other Central Oregon OHV opportunities during their trip (Personal conversation, Dick Duford 2002).

Play Areas

Seven material sites (pits) are listed as OHV play areas in OHV opportunity guides prepared by the BLM and USFS. These include four pits at East Fort Rock (two major pits and two smaller pits), one at Rosland in La Pine, and another in North Millican, and the ODOT pit. Pits are beneficial components of a larger trail system, because it provides an alternative to a trail system ride. During periods of extreme fire precaution these pits provide the only OHV opportunities on public lands.

The Millican Valley OHV area is located east of Bend and covers a north-south area extending roughly from U.S. Highway 20 north towards Prineville. The current boundary encloses 82,886 acres, of which 60 percent is located within Deschutes County and 40 percent is in Crook County, Oregon.

Three areas have been designated for OHV use: Millican Plateau; South Millican; and North Millican. Each area includes a designated road and trail system and different seasons of motorized use (See Table 3-14). In addition, the "ODOT Pit," owned by Deschutes County and the State of Oregon, is managed by BLM for OHV use. The ODOT pit is a large play area (10 acres) near the old town of Millican directly off of U.S. Highway 20, and provides a large percentage of the "pit" riding opportunities in the OHV area.

In FY 2000, OHV visitor use was approximately 15,000 user days. Road and trail riding at the Millican OHV area occurs year round but approximately 80 percent of the use is concentrated from November to May. In FY 2000, January through April was considered the main use period where approximately 60 percent of the total use for the year was during this period. During the months of May and June, OHV riding opportunities increase throughout the state and there are more attractive areas for the remainder of the year. This directs much of the OHV use away from Millican.

Approximately 75 percent of the riders come from the Portland, Salem and Eugene areas. The amount of use varies in each area and for each vehicle type. Only a small percentage (less than 5 percent) of the use occurred in the Millican South Area. The low use in the south area is due to the limited season of use and during summer when desert-type riding is not as attractive as other areas (e.g., forested, or higher elevation areas). The

Table 3-14. Designated Road and Trail Systems Seasons of Use

Activities	Millican Plateau	Millican North	Millican South
Number of Acres	29,212	35,423	18,251
Season of Use	Year Round	May 1 to November 30	August 1 to November 30
Road Miles	48	27	29
Trail Miles	63	61	12

greatest percentage of use comes from motorcycle (Class III vehicle types) in all areas.

Non-Motorized Dispersed Use

A wide variety of non-motorized dispersed recreation uses occur on BLM-administered lands in Central Oregon. These include mountain bicycling, horseback riding, hiking, running, rock climbing, fishing and hunting, target shooting, rock-hounding, wildlife viewing, visiting historic sites, and other educational activities. Although no user surveys have been done, much of this use is focused on specific areas, such as the Deschutes and Crooked River Canyons, several Dry River Canyons, the Badlands and Steelhead Falls WSAs, BLM-administered lands adjacent to Smith Rock State Park, and Horse Ridge. Several irrigation canals and ponds in the planning area receive regular visitation and use by recreationists.

Equestrian Use

Along with OHV use, equestrian use is one of the major dispersed recreational activities on BLM administered lands in the planning area. Equestrian use is dispersed throughout the planning area. Often, adjacent residents ride directly from their houses or rural subdivisions onto BLM administered lands.

Areas of concentrated equestrian use include the Cline Buttes area, particularly the Dry Canyon area south of State Highway 126 and west of Barr Road; the Badlands WSA, and BLM administered lands adjacent to Crooked River Ranch, adjacent to Smith Rock State Park, around the community of La Pine, and west of Tumalo. BLM administered lands are used to access longer trail ride opportunities on adjacent National Forest lands. Large, group rides are relatively commonplace on BLM-administered lands, although no designated or maintained trails exist on BLM administered lands for equestrians, and no staging areas have been developed for their use. The lack of developed trailhead parking areas has led to the development of roads and disturbed areas at popular, informal use staging areas such as State Highway 126 at Deep Canyon (between Redmond and Sisters). In other locations, the lack of developed or maintained trails has created unsafe conditions for riders, or has resulted in erosion and resource impacts as existing trails degrade or new trails are created. Conflicts are occurring between equestrians and other trail users, including mountain bicyclists and OHV users. This has led to requests from equestrians to have trails or areas designated only for non-motorized, non-mechanized use.

Hiking/Running

Areas with the most significant scenery or topography provide for interesting hikes or runs. These areas include BLM-administered lands near Smith Rock State Park, the canyon complex at the western edge of the Cline Buttes area, the Dry Canyon located adjacent to U.S. Highway 20 east of Bend, the Badlands WSA, Horse Ridge, Smith Canyon (North Millican area), and the Steelhead Falls WSA. Hikers and runners also visit the Horse Ridge and Skeleton Fire area east of Bend and the North Unit and other canals on BLM administered lands close to developed areas. Evening walks and hikes by adjacent residents are popular on BLM administered lands.

Trail hiking opportunities on BLM administered lands in the planning area are limited by the lack of identifiable, designated and signed trails. Only a few developed and maintained hiking trails exist on BLM administered lands in the planning area, including short trails at Steelhead Falls WSA and at Chimney Rock on the Lower Crooked WSR. Many user created hiking trails lead from parking areas to the Deschutes or Crooked River within the planning area. However, these trails are not marked, and most are difficult or dangerous access routes to the rivers. The steep slopes and trail conditions surrounding Crooked River Ranch typically result in several accidents each year

(personal conversation, Pat Reitz, Crooked River Rural Fire Protection District). In many cases, the access roads leading to these trailheads are rights-of-way roads that lead to residences on riverfront inholdings within larger BLM parcels. There have been conflicts at these locations as adjacent residences seek to limit access to visitors who park near their private property, arrive and leave late at night, light bonfires, party, and sometimes trespass on private property.

Mountain Biking

The opportunity to bike ride year-round makes Central Oregon an emerging mountain biking hotspot. Mountain biking is popular on adjacent National Forest lands, the CRNG, BLM administered lands, and lands managed by the Bend Metro Park and Recreation District. However, there are no trails designated for this use in BLM's transportation system. The BLM has no trail maps or recreation information specifically related to mountain biking.

Although no use figures are available, the demand for mountain biking opportunities on BLM administered lands is increasing. In the last five years, many guide books and maps have been published that show mountain bike routes on BLM-administered lands. Unauthorized trail construction by mountain bike enthusiasts has occurred over this period on east of Bend (particularly at Horse Ridge and Dry Canyon) and on lands adjacent to Smith Rock State Park. Over this period, the number of bike shops in Bend has also increased. The demand for mountain bike opportunities was projected in the Recreational Needs Bulletin, Oregon State Comprehensive Outdoor Recreation Plan (SCORP, 1991). SCORP data projected a 40 percent increase in demand for mountain bike opportunities in Central Oregon.

The use of BLM administered lands by mountain bicyclists occurs primarily in the fall, winter, and early spring, as snow levels in the Deschutes National Forest close those trails to cyclists. During the summer, many of the trails on BLM administered lands become too soft and dusty for mountain bike use.

The Horse Ridge area is considered the newest and best area for mountain bicycling on BLM administered lands in Central Oregon. However, private lands in the Cline Buttes, Horse Ridge, and other areas make development of designated trail systems more complicated than many National Forest system lands in Central Oregon. As the private lands at Cline Buttes, Horse Ridge and other areas are developed the ability to create longer trail loops for mountain bikes and other uses will decrease on BLM administered lands.

While the maintained trails in the Millican Valley OHV system are open to mountain bike use, most riders prefer to use trails that are not shared by motor vehicles (pers. conversation: Phil Hammerquist, Central Oregon Trails Alliance). Trails in the East Fort Rock OHV area (Deschutes National Forest) are also used by mountain bicyclists, and organized, competitive events have been held there. However, there is a concern among mountain bicyclists that many of the trails they have constructed will be found by motorized users, and the resulting motorized use will widen these single-track trails and ruin them for mountain bike use.

Rock Climbing

Rock climbing is an extremely popular activity at Smith Rock State Park and on adjacent BLM administered lands. These lands include some of the routes in the Upper Gorge area, where the columnar basalt columns along the river provide climbing opportunities. In general, these routes are not as heavily used as the routes in the Lower Gorge area that are on the west side of the river and close to the parking area at Smith Rock State Park. BLM administered lands also include the Marsupial Crags, rock spires located east of the

road locally known as "Burma Road". Because this area is more difficult to access from the State Park center, it likely receives fewer visitors. At one time, these routes were more accessible, but the Burma Road was closed to motor vehicles in 1994, and this climbing area must now be reached by foot.

The level of use and lack of maintenance on user trails on BLM administered lands adjacent to Smith Rock State park has resulted in vegetation disturbance and soil erosion in some areas. At Marsupial Crags, the access trails are located on steep and loose slopes, and have resulted in erosion, which is visible from a considerable distance.

Another climbing area of note within the planning area is the Sisters Bouldering Area, a 120-acre parcel of BLM administered lands northeast of Sisters in Fremont Canyon. Although this area is designated as "Open" in the 1989 Brothers/La Pine RMP, some roads into the parcel have been blocked with logs that define a parking area near the main climbing boulders. The Fremont Canyon area has a combination of BLM, State, County and private land ownership. Land exchange proposals for blocking up federal lands have been considered in the past, as Deschutes County has sought to sell county holdings in the area. These efforts have been unsuccessful, and the sale and residential development of lands adjacent to this climbing area is likely.

Pictograph Cave was developed with sport climbing routes in the early 1990s. Many routes were developed in the cave, with a total of about 80 bolt placements (drilled holes with expansion bolts and small metal plates or hangers) to protect climbers. Climbing route development in Pictograph Cave occurred about the same time as route development in other caves managed by the Deschutes National Forest. The development of climbing routes in these caves has resulted in conflicts between climbers, cavers, and others interested in cave management and cultural resources. Specific cave management strategies on the Deschutes National Forest have been assessed in the Road 18 Cave Management Strategy EA. Pictograph Cave is currently closed to all uses, pending completion of the UDRMP.

Target Shooting

Target shooting is a longstanding and widespread activity on BLM administered lands throughout the planning area. In addition to dispersed use on BLM administered lands, target shooters also use National Forest lands and several shooting ranges. Shooting ranges include the Redmond Rod and Gun Club and the Central Oregon Shooting Sports Association Range, which is located on BLM-administered lands along U.S. Highway 20 at Millican Valley.

Over the past decade, the increase in the number of subdivisions located adjacent to BLM administered lands has increased the number of target shooters and the number of complaints about unsafe target shooting practices. Concerns have included safety, litter, poor choice of shooting areas, noise, juniper tree damage, and disturbance to wildlife. The population growth of Central Oregon has resulted in increased numbers of recreationists on BLM-administered lands, some of which object to the amount of gunfire in areas that they use for hiking, horseback riding, mountain bicycling, walking pets and other activities. While many target shooters are highly conscientious about leaving no trace, the intense use of an area for target shooting often leaves the area strewn with garbage and with juniper trees cut in half by repeated gunfire.

Areas where resource damage or social conflicts occur include: an area south of Prineville and east of the Millican Road; an area along Lower Bridge Road south of Crooked River Ranch; the power-line corridor near the Redmond sewage treatment plant; areas near Alfalfa Market Road; a material site pit near the 61st/Young Avenue intersection in Redmond; and BLM administered lands immediately east of Bend along U.S. Highway

20 (see Public Health and Safety for a related discussion)

Rockhounding

Central Oregon is widely known for its recreational rockhounding opportunities. Quartz, calcite, and chalcedony including jasper and various types of agate are abundant in locally mineralized zones of the John Day and Clarno Formations inside and adjacent to the planning area. These formations also hold an abundance of petrified wood in volcanic ash and debris flow deposits. Large quantities of gem-quality obsidian occur at Glass Buttes east of the planning area and this location is a popular destination for flint knappers. On Forest Service lands in the Ochoco Mountains adjacent to the eastern boundary of the planning area, deposits of thundereggs, agate, and other semi-precious gemstones can be found.

Within the Upper Deschutes planning area, the Brothers/La Pine RMP designated five rockhounding sites. Inventories of rockhounding sites during the summer of 2002 showed that the Prineville Reservoir and Reservoir Heights sites had very little material of rockhounding significance and that petrified wood was essentially depleted from the portion of the Fischer Canyon site that lies west of Hwy 27. Moreover, this part of the Fischer Canyon site has paleontologic resources that need to be evaluated for scientific importance. Therefore, the sites listed above would be removed from designation in Alternatives 2-7. The North Ochoco Reservoir, Eagle Rock, and the portion of the Fischer Canyon site east of Hwy 27 will continue to be managed for rockhounding uses. A new site, the Carey Agate Beds, would be designated as a rockhounding site in Alternatives 2-7 (See Map 1).

Rockhounding areas (public and private, designated and non-designated) are being actively promoted by individuals, groups, internet sites, rock shops, publications, and the media. Moreover, the Crook County Chamber of Commerce estimates that 80% of their information requests are related to rockhounding in Central Oregon (USDI BLM, 2001). At some collecting sites, rock collectors have left numerous holes unfilled, undermined trees, excavated unsupported tunnels into the earth and have disturbed stream channels and riparian zones. Other impacts include OHV use, trespass, dense road networks, camping with no sanitation facilities and illegal removal and/or damaging of archaeological resources. Moreover, some collectors are taking large amounts of rock materials for illegal commercial use. Large scale collection threatens to deplete some sites of material and could result in the loss of future recreational opportunities.

Water Based Recreation

In addition to Reynolds and Mayfield Ponds irrigation canals that cross BLM administered lands provide a source of recreation. The Central Oregon and North Unit Irrigation Districts, together with the Bureau of Reclamation, operate and maintain several canals in the planning area. In the summertime, these canals have abundant water flows, and the North Unit canal in particular gets used by kayakers looking for a place to paddle close to Bend and Redmond, though it is viewed as trespass by the irrigation district.

Hunting

Hunting is a major recreational activity in the planning area, generally occurring in the late summer and fall. Hunting opportunities range from the more mountainous areas on the Ochoco and Deschutes National Forest to the lower sage and juniper woodlands areas on BLM-administered lands, including areas close to Bend, Redmond, and other communities and subdivisions. The variety of terrain and vegetation in Central Oregon provides good diversity and opportunities for hunters. The planning area receives

visitation from local, statewide and out-of-state hunters.

Mule deer, elk, and pronghorn are regularly hunted in the planning area. In addition, a variety of predators, including bobcats, cougars, and coyotes, are hunted. In particular, winter coyote hunting is popular in Central Oregon. There is no Bighorn Sheep season within the planning area. There is also no open season authorized for exotic sheep (e.g., Mouflon Sheep) on BLM administered lands in the planning area, although private landowners can authorize hunts on private lands.

Special Recreation Permits

Special Recreation Permits (SRPs) are issued by the BLM for commercial recreation use of BLM administered lands. Typically SRPs are issued on an annual basis for outfitter/guide activities such as hunting guides, commercial horse trail rides, rock climbing and hiking guide services, mountain biking guides, and for single-day events such as motorcycle races or endurance horse rides.

The BLM currently issues two annual use permits, both of which are for equestrian trail rides. One permit is held by Equine Management, which operates out of the Eagle Crest Resort, west of Redmond. The other is held by Rock Springs Guest Ranch, which operates from private land near Tumalo. In addition to these permits, several other fishing and hunting guide permits are issued in the planning area.

There has been a marked increase in the number of permits requested over the last several years, and in the number of commercial entities who are operating without a permit on BLM administered lands. Permit requests have come from many groups, including mountain bike guide services, equestrian guide services, schools and recreation districts, and race organizers. The Deschutes National Forest currently has about 27 recreation Special Use Permits (SUPs) for outfitter/guide services (personal conversation, Mark Christianson, USFS). The BLM currently manages very few permits. Many new permit requests are for activities in the Steelhead Falls WSA and Badlands WSA. The issuance of these permits for commercial use within a WSA requires that the BLM conduct an environmental assessment (EA). The time and staffing requirements to prepare EAs has led the BLM to deny such permit requests.

Transportation and Utility Corridors

Transportation Systems

Within the planning area, especially around Redmond and La Pine, the boundary of urban development extends to adjacent BLM administered lands. Therefore, growing communities rely on the adjacent BLM administered lands for expansion needs. In the future, BLM administered lands may be needed to provide for expanding infrastructure including new highways and by-pass roads around urban areas.

There are a variety of roads on BLM administered lands, ranging from primitive roads or ways to arterials such as major highways. A primitive road or way is not maintained to guarantee regular and continuous use. Resource roads carry very low volumes and are normally spur roads that provide point access. Local roads serve a small area, receive low traffic volumes, and generally serve only a few uses. Many of these roads in the planning area were not constructed and are considered user created travel ways.

Generally, user-created roads do not provide connectivity to specific destinations. Collector roads normally provide access to large blocks of public land and connect with or are extensions of public road systems. Collector roads receive moderate traffic

volumes and accommodate mixed types of traffic and uses. Arterials are State highways or major county roads designed to accommodate mixed types of traffic and serve many uses. They receive high volumes of traffic and safety, comfort and travel times are primary road management considerations.

BLM administered lands are currently accessible from a wide variety of roads including, state highways, county roads, local roads, and public ways. The network of BLM collector roads provide widespread access to BLM administered lands provides administrative access for authorized uses, various casual uses, and opportunities for dispersed recreation throughout the area.

Maintenance/Jurisdictions

There are no interstate highways in the project area. The ODOT has responsibility for the following highways in Central Oregon that cross BLM administered lands:

- U. S. Highway 97, the main north/south route through the center of the state is designated as an expressway. An expressway is a multi-lane highway that is designed to provide for safe and efficient high speed and high volume traffic movements for both inter-urban and intra-urban travel. Expressways are a subset of Statewide Regional and District Highways. Segments of this highway are currently being considered for expansion or relocation, which may affect adjacent BLM administered lands.

- U. S. Highway 20, the main east/west route through the center of the state, is designated as an expressway within the project area. It is currently being considered for widening between Bend and Sisters.

- State Route 126, the connector between Sisters, Redmond, and Prineville, is considered for expressway status. ODOT is planning to install passing lanes on segments between Redmond and Prineville. A two-mile segment of the highway located east of Redmond may have to be relocated through the adjacent BLM administered lands to avoid the runway protection zone for the Redmond Airport.

- U. S. Highway 26, from Madras through Prineville, does not cross BLM administered lands except for one parcel located near Ochoco Reservoir.

- State Route 27, from Prineville to Bowman Dam to U.S. Highway 20 near Millican, is the only remaining State Highway with segments of gravel surface. It maybe considered for exchange of jurisdiction with Crook County for the Millican – West Butte Road.

- Powell Buttes Highway is a State Highway from State Route 126 to the Crook county line, and a Deschutes county road to U. S. Highway 20.

Recent legislation has provided for a transfer of the West Butte Road (BLM Road 6520), to the respective county jurisdictions. The road extends south from the "Four Corners" area to Highway 20, a distance of approximately 14.7 miles, with segments in both Crook and Deschutes County. Four Corners is the intersection of the subject road with the Prineville Reservoir road. The counties plan to improve the road to a paved highway standard and may eventually convey jurisdiction to the State.

There are approximately 151 miles of BLM roads in the planning area that are maintained for administrative purposes. Roads are maintained at various levels, depending on maintenance needs and funding. Maintenance levels reflect Transportation Management Objectives for planned management activities.

Maintenance levels and standards on individual roads vary from a minimum standard road such as a local or resource road that is not maintained on a regular basis, to a surfaced road. Road surfaces include native soil, cinders, crushed rock, pit run gravel, oil applied to crushed rock, and asphalt paving.

County jurisdictions have identified so-called "Historical roads" from research gathered from historical records. These roads provided a transportation network for early settlers and continue to be recognized by the county as public roads. Historical roads are not necessarily improved or maintained by the county. A formal vacating process is necessary if the county chooses to abandon the road. It is assumed that these roads were developed on un-appropriated public land before 1976, under the authority of Revised Statute (RS) 2477. By this law Congress provided, "The right of way for the construction of highways over BLM administered lands, not reserved for public uses, is hereby granted." These rights were to have been established in accordance with State law. It was not necessary at the time to obtain further review by the federal government. Records about historic roads are usually found in state or county records or other historical documents.

Transportation planning is accomplished as an inter-regional coordinated effort between federal, state, and local governments to support links between communities. Crook, Deschutes, Jefferson, and Klamath Counties have roads on public land throughout the planning area. County roads are public roads that are maintained by the county and accepted by the County Commissioners. A public way is dedicated by the county to the public but is not necessarily maintained by the county. County roads and certain county public ways have been authorized to extend through BLM administered lands with a right-of-way grant under the provisions of FLPMA.

Commercial development in Redmond has extended along both sides of Highway 97 and a highway interchange has been constructed at Yew Avenue. Because of increasing traffic and development, this and other intersections along Hwy 97 near Redmond are expected to fail in the next few years.

The Yew Avenue interchange was constructed approximately ten years ago to address congestion problems at the intersection of US 97 and Yew Avenue. Since then, the Deschutes County Fairgrounds, a large retail center, two motels, a restaurant and a car wash have located near the interchange increasing demand and congestion in the interchange area. The congestion that occurs at the Yew Avenue interchange during a medium to large event held at the Deschutes County Fairgrounds is a concern. Another concern is traffic congestion that may cause motor vehicle back up over the at-grade railroad crossing on Airport Way, just east of the Yew Avenue interchange.

ODOT in conjunction with the South Redmond Collaborative Planning Team is evaluating several proposals for highway improvements in the south Redmond area. In January 2003, ODOT completed the "Yew Avenue to Deschutes Market Road Analysis for the City of Redmond." The preferred alternative includes the extension of 19th Street south to a proposed interchange at the US 97/Quarry Road intersection with an extension four miles south to the existing Hwy 97/Deschutes-Market road interchange.

Utility and Road Rights-of-Way

The BLM grants federal, state, and local governmental agencies, companies, cooperatives, and private individual's rights-of-way to develop necessary transportation, utility systems through BLM administered lands. A right-of-way grant is an instrument that authorizes the use of BLM administered lands for specified purposes, such as roads, utility lines, communication sites and energy development sites (See Section 501, 43 USC 1761).

Regional Right-of-way Corridors

A right-of-way corridor is an existing alignment that has been identified as a preferred location to accommodate similar or compatible projects. Public land law directs BLM to minimize adverse environmental impacts by avoiding the proliferation of separate rights-of-way and using rights-of-way in common, to the extent practical (Section 503 (43 U.S.C. 1763).

At the present time there are approximately 200 miles of regional corridors identified by the Western Utility Group that extend through BLM administered lands in the planning area. Corridor routes identified by the Western Utility Group are designated in this land use plan and include routes for electric transmission lines and natural gas pipelines. Future development of these corridors would be subject to environmental review based on a specific proposal.

Rights-of-way for Communication Sites

There are three existing communication sites located in the planning area, shown in Table 3-15. Uses at these communication sites include government agencies that provide emergency services and two-way radio communications, commercial telecommunication providers, and multiple user facilities that are independently managed by a right-of-way holder. These sites are exclusively for low power use and high power broadcasting is strictly prohibited. There is adequate space available at these sites to accommodate additional users during the next 10 to 15 year period. There is currently space available within existing facilities, as well as land area for additional new construction, if necessary.

As the population of the region grows, it is anticipated that the demand for high elevation sites may increase slightly, however the demand for low elevation sites, especially cell phone towers, is expected to increase significantly. The demand for cell tower locations along transportation corridors will increase to provide improved coverage for cell phone users. Antennas for cellular telephones can co-locate on existing utility structures and are capable of sharing structures with multiple providers.

Rights-of-way for Energy Development

A right-of-way is used to authorize sites for wind and solar energy projects. The President's National Energy Policy requires that BLM increase and diversify the sources of both traditional and alternative energy resources, improve the energy transportation

Table 3-15. Communication Sites

Site Name	Legal Description	Elevation	Designation
Grizzly Mountain	T. 13 S., R. 15 E., S. 17, SE¼	High	Low Power – Broadcast
Cline Buttes A	T. 15 S., R. 12 E., S. 21, SW¼NE¼	Low	Low Power
Cline Buttes B	T. 15 S., R. 12 E., S. 21, SE¼NW¼, N½SW¼	Low	Government Only Air Navigation Site FAA Withdrawal

network and ensure sound environmental management. This integrated policy approach requires BLM to ensure that there is a sufficient means to both develop energy resources and transport energy supplies in an effective manner while still maintaining current environmental standards and good stewardship principles. It is BLM policy to consider the need for the production and distribution of energy and to encourage the development of renewable energy sources in acceptable areas (USDI-BLM, Washington Office Instruction Memorandum No. 2002-196).

BLM and the National Renewable Energy Laboratory (NREL) have established a partnership to conduct an assessment of renewable energy resources on BLM administered lands. The objective was to identify planning units with the highest potential for development of renewable resources. A team of BLM and NREL representatives have established screening criteria to use in identifying suitable locations and have classified the wind and solar resource potential of lands in the eleven western states (USDI, Bureau of Land Management and U.S. Department of Energy. 2003).

According to NW Sustainable Energy for Economic Development (NWSEED), the resource potential for wind energy development in the planning area is rated as poor to marginal with the exception of the upper portions of Grizzly Mountain, Horse Ridge, Powell Buttes and West Butte, which are rated as fair. Regional utility corridors are located in the immediate vicinity of these topographic highs and could provide the necessary infrastructure to market the resource. At this time, there are no pending applications or wind energy developments on BLM administered lands within the planning area.

Solar energy is used to produce electricity in two ways. Photovoltaic systems produce electricity directly from sunlight whereas solar thermal technologies collect heat energy from the sun on a large utility-scale to generate electricity. The National Renewable Energy Laboratory (NREL) created a solar assessment for the U.S. with a resolution of approximately 40 km x 40 km. According to this assessment, the Concentrating Solar Resource (CSR) in the planning area averages 5 kWh/m2/day, which is higher than the national average of 4 kWh/m2/day (Oregon Office of Energy, 2003). This is more than enough for operation of individual residential photovoltaic systems. No solar energy developments are present on BLM administered lands within the planning area and no applications have been filed for any developments.

Summary

During the period the Brothers/La Pine RMP has determined the management of BLM-administered lands in the planning area, 1989 to the present, an average of about 25 new rights-of-way per year were granted. There are approximately 742 local utility and transportation right-of-way grants in the planning area that extend 780 miles through public land. These include rights-of-way corridors and communication sites that may contain more than one project. Most rights-of-way were granted to provide access or utility service through BLM administered lands and include roads/driveways and electric/telephone service. There has been no interest expressed by industry for solar or wind energy development in the planning area.

Land Ownership

In the past, Central Oregon land patterns contained centralized urban areas where locally produced forest and agricultural products were collected, processed, and distributed. For example, trees were logged and shipped from the forests to the towns where they were processed into lumber. Ranches were large and for the most part self-contained. Many of

the larger ranches have been broken-up. Modern transportation systems provide for fast transition from the agricultural lands to the urban lands and have blurred the rural/ urban distinction. People often hobby farm or use their rural lands to supplement income from their city jobs.

Where once small towns were surrounded by agricultural lands, the perimeters of some towns and cities are surrounded by subdivisions and hobby farms with limited amounts of large scale agriculture taking place between the urban settings and BLM administered lands (see Map 1).

Adjacent or in close proximity to most of the towns and service centers are subdivisions, collections of 2, 5, 10, and 20 acre lots with homes and mini-farms or ranches. The density of dwellings have increased adjacent or in close proximity to all the towns and service centers. One such subdivision is Crooked River Ranch in southern Jefferson County.

Large blocks, about 4,000 acres or larger, of BLM-administered lands are located within the planning area, which are often adjacent to larger blocks of BLM administered lands also administered by BLM or USFS lands that are outside the planning area though still within the counties.

Crook County comprises about 1,914,240 acres, of which about half is BLM administered lands. Deschutes County is about 1,955,200 acres, of which about 80 percent is federal land. The BLM manages 54 percent of the federal land in Crook County, and 31 percent of federal land in Deschutes County.

Larger blocks of BLM administered lands, either BLM or Forest Service, are within a few miles of all the cities and communities, thus, readily available to the public. Smaller blocks of BLM administered lands are often closer to these cities and often adjacent to the communities.

Smaller blocks of BLM administered lands administered by BLM are scattered throughout the planning area; however, there are concentrations located near Grizzly Mountain north of Prineville, between Prineville and Prineville Reservoir, northwest of Redmond, and around La Pine/ Wickiup Junction. These concentrations of smaller blocks may be part of a larger block of BLM administered lands, for example, all BLM administered lands around Crooked River Ranch. Otherwise, the concentrations may be isolated parcels amid private lands, for example, the parcels southeast of Prineville. These isolated parcels were often located in agricultural areas, as part of a larger open rangeland, but these pockets are becoming surrounded by subdivisions now, and, as a consequence, they are becoming isolated from availability to the general public.

Withdrawals

Some lands managed by the BLM have been withdrawn within the planning area. Withdrawals have occurred in order to transfer total or partial jurisdiction of federal land between Federal agencies, and to segregate (close) federal land to some or all of the public land laws or mineral laws, or to dedicate land for specific public purposes.

The planning area has existing withdrawals for military training activities at a site 2 miles southeast of Redmond and at a site 8 miles east of Bend, for two exchanges, and for numerous public water reserves and power development purposes primarily along the Deschutes and Crooked Rivers. Under a withdrawal, the future uses of the lands would be determined by the entity for which the land was withdrawn. That entity (e.g. Army Corps of Engineers for the Oregon Military Department) has control over the land until they relinquish the use of the lands or BLM determines that the use of the lands requested in the withdrawal were no longer being used for the intent described in the withdrawal.

Leases and Permits

Temporary land use permits or leases may be used to authorize such activities as trespass prior to resolution, access, storage, apiary sites, National Guard or military reserve training, engineering feasibility studies, and other miscellaneous short-term activities.

Two to four permits are issued annually for photography and film, although the number of requests is typically greater.

Military training has occurred on 31,000 acres southeast of Redmond since the late 1930s (See Oregon Military Training Use under Land Uses). The BLM and the military are discussing the option of permitting training under a long-term lease. Temporary authorizations differ from withdrawals in that the permitted use is short term, the BLM retains administrative responsibility for the lands, and few or no permanent facilities are permitted.

The Recreation and Public Purposes Act

The Recreation and Public Purposes Act (R&PP) authorizes the sale or lease of BLM administered lands for recreational or public purposes to State and local governments and to qualified nonprofit organizations. In the planning area, R&PP has been used for sewage treatment facilities in Bend, Redmond, and La Pine; golf courses, libraries, parks, and shooting ranges. In the future, it is anticipated that R&PP will be used for sewage treatment facility expansions, municipal parks, expansion of state parks, and public buildings such as fire stations or schools.

In 1995, Central Oregon Shooting Sports Association (COSSA) leased approximately 450 acres of public land for use as a public shooting range. The range is located immediately north of U.S. Highway 20 near the Millican town site. The site is managed as a shooting range by COSSA, with BLM oversight. While the site remains open to the public, and is extremely popular for organized group events, it generally does not draw casual, daily use from surrounding populations, such as Prineville, Redmond, Terrebonne, or Crooked River Ranch.

The Bend Aero Modelers Club was granted an R&PP lease in 1999 for a 5.75 acre site northwest of Dry Canyon and immediately north of U.S. Highway 20. This site is used for operation of gas powered model airplanes.

Public Health and Safety

Firearm Discharge

Over the past decade the increase in residential development adjacent to BLM administered lands in Central Oregon has multiplied the number of people shooting firearms, the total number of people recreating, and the number of people living near BLM-administered land. It has also increased the number of complaints about firearm discharge. While both target shooting and hunting occur throughout the planning area, many site-specific conflict areas have been identified through complaints from adjacent landowners, and other BLM land users. In other cases, target shooting areas have become a problem due to the amount of debris left behind by target shooters, including shell casings, plywood, paper targets, bottles, metal debris, and miscellaneous trash. While many target shooters are highly conscientious about minimizing their impact on public land, the intense use of an area for target shooting often leaves the area strewn with garbage and with juniper trees cut in half by repeated gunfire. These conditions do not facilitate appropriate recreational opportunities.

Illegal Dumping

Illegal dumping in the planning areas has, and continues to be, a serious management issue. While abandoned vehicles are perhaps the most noticeable debris being dumped, the dumping includes residential, commercial, industrial and hazardous waste. Additionally, large quantities of animal remains can be found on Central Oregon's BLM administered lands, left by pet owners, ranchers and area hunters. The foremost danger from this waste is the risk to human health, especially in relation to hazardous wastes. BLM has already conducted hazardous waste responses to paints, used fuel/oil, asbestos, batteries (lead), medical wastes (needles and sharps), wire burns and methamphetamine lab waste within the planning area. These have averaged about two per year, but are expected to increase in frequency with an increase in human populations. Other concerns include degradation of visual resources, and recreation opportunities. Indirectly, the existing waste is contributing toward the dumping of additional wastes because violators feel dumping is more acceptable in areas with existing waste. Discarded trash is commonly used as a target by target shooters, further breaking the existing waste up into smaller pieces, and lowering expectations of all BLM land users. The illegal dumping is more prevalent where there are numerous dirt access roads and it is relative easy to drive out of sight and dump debris. These sites are usually within a quarter to one-half mile off the pavement. Concentrated areas of public land dumping occur outside Redmond, Bend, La Pine, Prineville and Terrebonne/Crooked River Ranch. Particular problem areas include the following BLM administered lands (See Map S-17, Illegal Dumping Areas):

1. South of Prineville along Millican Road
2. South of Prineville at Juniper Canyon
3. South of Prineville off Remington Road;
4. South of O'Neil Highway and west of the North Unit Cana
5. East of Redmond and west of the North Unit Canal;
6. South of Redmond along Airport Avenue;
7. Northeast of Bend off Powell Butte Highway;
8. Immediately north and south of Alfalfa Market Road;
9. Barr Road in the southern portion of Cline Butte
10. Lands at the State Highway 126/Barr Road/Buckhorn Road intersection
11. Steamboat Rock area west of Terrebonne and South of Crooked River Ranch; and
12. Numerous locations in La Pine.

Campfires

Campfires are a concern because they increase the risk of wildland fire. The tremendous population growth in Central Oregon has magnified the risks of wildland fire, both to communities at risk, and to BLM administered lands. Undesired effects of these fires include threats to human life, property, and natural and cultural resources. These threats are especially significant in urban interface areas synonymous with much of the planning area, where high densities of people and residences can be found (See Fire Section).

From a recreation opportunity perspective, campfires are not appropriate in specific areas within the planning area. Special areas, including RNAs, ACECs, and other highly visited, highly developed sites, are generally managed for research and interpretation. In addition, trailheads and staging areas are not appropriate for campfires because they are inherently congested areas where any additional activities have an increased likelihood of resulting in increased user conflicts.

BLM Law Enforcement Authority

Currently BLM law enforcement rangers can only enforce limited Oregon state and local

laws. This limited authority reduces BLM law enforcement's effectiveness, hampering efforts to efficiently and effectively address violations on BLM-administered land. These limitations also require increased time and support from state, county, and city law enforcement officers, and diminish the level of public health and safety on BLM-administered lands.

Archaeology

Prehistoric/Historic Resources

Archaeological resources are fragile, non-renewable resources. Many natural processes and human activities have an adverse effect on the condition and integrity of archaeological resources. However, most processes, with the exception of wildfire, flooding, or where initiated by human activities, generally result in slight to moderate damage. In these cases, most impacts can be mitigated before substantial damage occurs. In contrast, human activity can rapidly and irreversibly damage archaeological resources, contributing to the diminishment of the resource base (BLM, 2000:6).

Cultural resource surveys have been conducted over approximately 22 percent of the total planning area. Those surveys have resulted in the documentation of hundreds of prehistoric and historic sites that represent a broad spectrum of past human activity within the area. Documented sites include, but are not limited to: lithic scatters; rock features; temporary prehistoric camp sites; rock art; remnants of homestead cabins; segments of historic trails; roads and canals; and landscape settings linked to ranch houses, corrals, barns and animal husbandry. Despite what is known about the number of documented sites, few of those recorded sites have been evaluated for their significance or their eligibility to the National Register. Evidence indicates that numerous other sites remain within the planning area remain to be discovered and recorded.

The integrity of these resources is currently threatened by a variety of causes. Some causes, such as natural weathering and erosion, gradually deteriorate archaeological resources. Others, such as natural or human caused fire or vandalism and theft, can destroy archaeological resources in a matter of minutes.

Human activities that can directly or indirectly affect the archaeological resource base include urban development, authorized commercial activities, recreational uses, military maneuvers, livestock grazing, and target shooting. Efforts to increase public awareness about the significance of archaeological resources and laws protecting them have failed to eliminate illegal artifact collecting and vandalism of these resources. Despite some convictions for violations, present law enforcement efforts aimed at stopping the vandalism at prehistoric/historic sites have not eliminated intentional removal or destruction of archaeological resources. It is expected that the incidence of illegal artifact collecting and vandalism will increase as the population in the area grows and increasing numbers of individuals make use of BLM administered lands.

Despite the many ways human activities can diminish the archaeological base, sites also exist across the planning area that maintain good to excellent integrity (Hall, 1994: 118; Oetting, 1997a: 105; Oetting, 1997b: 80; Ellis, et. al., 2000). Some are associated with historic events, important persons, contain engineering features and/or could yield significant information to our understanding about past human lifeways (Ellis et. al, 2002:48). Research questions that information from such sites could answer include those related to settlement and subsistence, demography, technology, exchange and external relations, chronology, paleo-environments, or site formation processes (Houser, 1996:37-48).

Cultural Resources (National Register Sites /Historic Properties)

National Register Sites, or historic properties, are defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register of Historic Places, including artifacts, records, and material remains related to such a property or resource" [16 U. S. C. 470w(5)]. Eligibility for inclusion to the National Register is determined by criteria established by the National Historic Preservation Act of 1966 as amended. Historic properties that are included, or eligible for inclusion, in the National record are those that are considered unique, provide information important to the study of history or prehistory, and/or are associated with important events or persons that have made contributions to the broad patterns of our history.

Currently, none of the cultural resource sites identified and evaluated within the planning area are listed on or considered eligible for inclusion in the National Register. However, many of those sites have not been fully evaluated to determine their eligibility potential. Furthermore, evidence indicates that numerous other undocumented sites exist in areas that have not been surveyed yet. Therefore, evaluations of known sites, combined with additional surveys and/or site testing, are necessary to provide more complete information about the prehistoric and historic use of the area, as well as National Register site eligibility.

Traditional Cultural Property (Traditional Uses)

A Traditional Cultural Property (TCP) is a place that is eligible for inclusion to the National Register of Historic Places because of the significant role the property plays in a living community's historically rooted beliefs, customs, and practices (Parker and King 1994:1). Currently, there are no traditional cultural properties that have been identified within the planning area. However, identification of those properties cannot be effectively accomplished without consulting with the groups and individuals who have special knowledge about, and interests in, the history and culture of the area. In view of those considerations, the existence of traditional cultural properties within the planning area will remain unknown until the appropriate level of background research, fieldwork and tribal consultation has been completed.

Plants of Cultural Significance to Contemporary Indian People

Three federally recognized Indian tribes reside in Central Oregon; the Confederated Tribes of the Warm Springs Reservation of Oregon, the Klamath Tribes, and the Burns Paiute Tribe. The federal government, through treaties, congressional acts, court cases and executive orders has acknowledged its role and responsibility in consulting with Indian Tribes when federal actions may affect areas of traditional cultural significance (Hanes 1995:27-29). In keeping with the spirit of that obligation, the BLM recognizes that local Indian Nations have recognized interests to harvest a broad range of plant species found on BLM administered lands. Access to, and availability of, those species is considered by Indian governments a trust responsibility of the federal government. A number of "cultural plant" species occur within the planning area. Cultural plants are defined as those plants which are used by Native Americans for subsistence, medicinal, utilitarian, economic or ceremonial purposes (Hunn *et al.*, 1998:526- 536). See Table 3-16: Cultural Plants, for a list of culturally used plants that occur in and around the planning Area.

Table 3-16. Cultural Plants Occurring In and Around the Upper Deschutes Planning Area

Scientific Name	Common Name	Habitat
Allium species	Wild onion	Dry hillsides.
Amelanchier alnifolia	Serviceberry	Open woods; hillsides; riparian
Apocynum cannabinum	Dogbane (Indian Hemp)	Wet hillsides; riparian
Archilea millefelium	Yarrow	Sandy, lithic soils
Artemesia tridentata	Sagebrush	Numerous
Balsamorhiza species	Balsamroot	Dry hillsides
Calochortus macrocarpus	Sego Lily or Mariposa Lily	Sagelands, volcanic soils
Camassia quamash	Camas Meadows	moist areas; riparian
Cereoarpus ledifolius	Mountain Mahogany	Dry hillsides and ridge tops
Cornus stolenifera	Red Osier Dogwood	Riparian
Elymus cinercus	Great Basin Wild Rye	Damper soils in sagelands
Fritillaria pudica	Yellowbell	Lithic or sandy soils
Juniperus occidentalis	Juniper	Hillsides, ridges, riparian
Lewsisia redivia	Bitterroot	Lithic soils
Lomatium canbyi	Canby's Desert Parsley	Lithic soils
Lomatium cous	Biscuitroot	Lithic soils
Lomatium macro.	Gray-leaf Desert Parsley	Lithic soils
Lomatium nuducauli	Desert Celery	Lithic soils
Perideridia species	Yampah or Ipos	Meadows, grasslands, scabflats
Prunus virginiana	Chokecherry	Moist areas
Rosa species	Rosehips	Sunny openings, riparian, talus slopes
Ribes species	Golden Currant, Rock Currant	Riparian, moist areas on hillsides
Salix species	Willow	Riparian
Sambucus canadensis	Elderberry	Riparian

(Plants of cultural significance courtesy of The Burns Paiute Tribe and the Confederated Tribes of Warm Springs, Ordinance 68)

At-Risk Significant Archaeological Resources

At least six At-Risk significant archaeological resources have been identified within the planning area. These are Horner Road, Tumalo Canals, Redmond Caves, Bend-Prineville Road, Pictograph Cave, and Steelhead Falls. Three of those sites, Horner Road, Tumalo Canals, and the Bend-Prineville Road are considered eligible to the National Register for their association with events that have made significant contributions to the broad patterns of local history. Although the other three sites have not been evaluated for their significance, it is likely that they would yield important information about prehistoric lifeways or are significant to local Indian tribes for their sociocultural values. It is likely that other significant archaeological resources that have not yet been discovered, documented or evaluated are at risk from various natural and human caused threats.

Human Activities

Human activities that are currently affecting and have the potential to impact identified "at-risk" resources are as follows:

Horner Road and the Bend-Prineville Road are historic roads located between the communities of Redmond and Bend that were developed during the late nineteenth and early twentieth centuries. In total, the roads have over one hundred historical elements that contribute to their integrity and significance. The roads are currently at risk from permitted military activities, adjacent road development, and unmanaged recreational uses. Those activities have contributed to soil compaction and displacement, damage to minor engineering features, and vandalism. Disposal of trash along the roads has also become a problem. During the early 1990s an area along one of the roads was opened to woodcutting and an unknown number of historic features were destroyed.

Redmond Caves are five lava tube openings on a 40-acre parcel administered by the BLM but located within the boundaries of the City of Redmond. Evidence indicates that the location may contain important information about prehistoric lifeways. Local Indian tribes have also implied that the area may be significant to them for its sociocultural values. The area is a popular location for teenage parties and unmanaged recreational uses such as OHVs, mountain bikes, camping, cave exploration, paintball competitions, and geocaching. Disposal of trash is a problem in the area. Those activities have resulted in soil compaction, erosion, surface disturbance, vandalism and artifact collecting. Illegal use of campfires within caves is causing a build-up of soot on cave walls and ceiling areas.

Tumalo Canals are a segment of historic canals located between the communities of Redmond and Sisters that were developed during the first decades of the twentieth century. The irrigation system includes berms and troughs, raceways, diversion structures and other engineering features that contribute to the system's integrity and significance. The canals are currently being impacted by livestock grazing and unmanaged recreational use such as horseback riding and OHV use. These activities have caused canal sidewalls to collapse and erode and soil in berms to be displaced and compacted. In some instances, historic features have been used as shooting targets.

Pictograph Cave is an unevaluated, collapsed lava tube cave that may possess important information about prehistoric lifeways. Local Indian tribes have also implied that the area may be significant to them for its sociocultural values. Currently unauthorized motorized vehicle access, rock climbing and improper cave uses are affecting the site. Unauthorized motorized use has compacted soils and displaced artifacts, visitors to the site have developed a number of user created trails, and climbers and their climbing apparatus threaten cave resources. It is likely that artifact collecting has also occurred.

Steelhead Falls is an unevaluated rock art panel between the communities of Redmond and Sisters that may possess important information about prehistoric lifeways. Unmanaged public use of the area has contributed to vandalism and user created trails.

Chapter 4
Environmental Consequences

Introduction

This chapter describes the environmental consequences of implementing the seven alternatives described in Chapter 2. The chapter is organized according to the issue categories identified in Chapter 1, describing the effects of each of the alternatives within each issue category. Under each issue category is a description of the assumptions used in the analysis, general relationships of the decisions made in this RMP to environmental effects, and a description of the effects of each of the alternatives. Each section starts with a summary of the environmental consequences for that issue category.

Relationship of Decisions to Environmental Consequences

The Upper Deschutes Resource Management Plan is a land use plan that guides future management actions. Decisions made within this plan are primarily land use decisions as described by the BLM Land Use Planning Handbook (Handbook 1601-1). These are decisions about allocations and allowable uses or conditions under which future activities will be conducted, rather than site-specific decisions that authorize an activity. Land use decisions as provided for here generally do not make irreversible or irretrievable commitments of resources, and will require subsequent analysis as required under the National Environmental Policy Act before they are implemented.

Direct, Indirect, and Cumulative Effects

The Council on Environmental Quality directs federal agencies to examine three types of effects of their decisions: direct, indirect, and cumulative. Direct effects occur at the same time and place as the federal action or decision; indirect effects are caused by the decision, but take place at a later time or are farther removed in distance, but are still reasonably foreseeable; and cumulative effects are the combination of direct and indirect effects of the decisions made here, combined with other continued trends or anticipated effects that are outside of the scope of the RMP decisions, but may affect the resources discussed here. For instance, projected population growth rates within the planning area are not affected by the decisions made in this plan, but are likely to continue to affect the resources analyzed here.

Land use decisions generally fall into the "adoption of formal plans" category as described by CEQ regulations[1]. These kinds of decisions have limited direct effects on the natural and physical environment because they do not make irreversible and irretrievable commitments of resources, but rather make decisions about the availability of lands for certain uses or the conditions under which future uses may or may not occur. Consequently, most of the environmental effects discussed in this chapter are based on indirect or reasonably foreseeable future actions that are a likely outcome of implementing the land use plan. These reasonably foreseeable or probable actions are primarily represented by assumptions or general relationships of the decisions to the environmental effects and are described in the beginning of each section.

Critical Elements of the Human Environment

The BLM requires consideration of certain elements that are identified as critical elements of the human environment. These include effects to air and water quality (ground and surface), energy resources, cultural resources, hazardous and solid waste, invasive and non-native species, floodplains, wetlands and riparian zones, prime and unique

farmlands and threatened and endangered species. Critical elements also include effects to special designations such as suitable or designated Wild and Scenic Rivers, Areas of Critical Environmental Concern (ACEC), National Natural Landmarks or National Landscape Conservation Areas, Wilderness and Instant Study Areas, significant caves (in accordance with the Federal Cave Resources Protection Act); and effects on native American religious concerns, the Environmental Justice Act, and the national energy policy.

The planning area does not include any designated Wilderness areas. Prime or unique farmlands exist within the area (see Chapter 3), but are not affected by the decisions made in this plan. Other critical elements are discussed in this chapter under each of the issue categories.

Environmental Consequences of the Alternatives

General Assumptions

Throughout this analysis, assumptions about expected future actions or conditions, or general relationships between the decisions being made and expected environmental consequences, are used to facilitate the analysis. Some basic assumptions used for all resources are described below.

Decision Authority

All decisions made by the RMP would be in accordance with national policy and direction, and would be in force until a revised or amended land use plan changes those decisions. All RMP decisions anticipate continuation of all valid existing rights. Currently authorized permits would be brought into compliance with new requirements as soon as is reasonably practicable following the Record of Decision, and in accordance with legal authorities that guide those permits.

Duration of the Plan

The RMP is expected to guide land use activities for the next 10-20 years.

Implementing the Alternatives

All of alternatives anticipate future actions needed to implement management direction that will require funding and personnel. For many program areas past funding has been insufficient to meet demands, and future funding levels are uncertain, but are not likely to show substantial increases. For the purposes of this analysis, we have assumed that existing resources and personnel would be redistributed to respond to new priorities set by this plan, although the amount of work accomplished annually to meet plan direction would continue to be dependent upon annual budgets and overall BLM priorities. Full plan implementation assumes increased cooperation with other agencies, supplemental funding and resources supplied through grants, and an active volunteer program.

Mitigation

Mitigation measures that would avoid, minimize, rectify, reduce, or compensate for adverse environmental effects of implementing the alternatives are included in the

allocations, allowable uses, objectives, and guidelines for each of the alternatives. These are summarized in Chapter 2, and described in detail in Appendix A. All analyses presented here incorporate those requirements.

Acreage

Acreage figures and other numbers used in this analysis are approximate projections for comparison and analytic purposes only. They do not reflect exact measurements or precise calculations.

Ecosystem Health and Diversity

The goal for this issue is to restore and support healthy ecosystems in conjunction with expected human population levels and uses, vegetation and wildlife habitat needs, riparian conservation strategies, watershed restoration methods, and economic reliance of the population on public lands. Land uses and activities would emphasize ecosystem sustainability and health throughout the planning area. In addition, the agency recognizes fire's role in the ecosystem and establishes risk classes that provide guidance for fire suppression and fuels treatments, particularly in the wildland urban interface areas. Ecosystems would be managed to re-introduce an approximation of natural disturbance cycles through the use of prescribed fire and mechanical methods.

Vegetation

Summary

Alternative 1 (the current situation), would have the greatest effects on vegetation in terms of uncontrolled motorized recreation and travel in "open" areas. Direct effects on vegetation by motorized vehicles would be more widespread, occurring on more acres off roads and trails. In terms of acreage, this effect has occurred, or has the potential of occurring, on 38 percent (154,000 acres) of the planning area.

Common to Alternatives 2-7, a designated road and trail system is proposed. As a result, motorized recreation and travel effects on vegetation would only occur within the area determined by the width and length of existing or new roads or trails. This would minimize the effect on plant communities, although some illegal travel and access would occur. The potential for spread of noxious weeds or other undesirable invasive plant species by motorized travel (and travel by any means) would continue to be present. Of the action alternatives, the alternative with the least effect would be Alternative 7 because it closes the greatest amount (23 percent) of area to motorized travel (91,000 acres). The action alternative with the most effect to vegetation would be Alternative 2 because it closes only 5 percent (20,370 acres) of the planning area to motorized travel.

Alternatives 3, 6 and 7 would have the greatest ecological benefit to vegetation since they would treat the greatest amount of acreage with restoration and fuels reduction treatments (230,250 acres). Alternatives 2, 4 and 5 would have less ecological benefit since they treat 168,310 acres. Alternative 1 would have the least ecological benefit because it proposed to treat only 71,000 acres.

The "historic" vegetation management strategy implemented under Alternatives 3, 6, and 7 would restore ecosystems and reduce wildfire potential faster and over a broader area than other alternatives. Treatments using this strategy would return ecosystems to their historic condition and distribution for major vegetative types. While the exact vegetative condition and distribution would never again exactly match the past, this "historic" baseline could be used as a guideline for formulating project plans and prescriptions. Historic condition and distribution is chosen as a management strategy based on the

assumption that ecosystems were in equilibrium and functioning as they were intended based on evolution and adaptations that occurred under the influence of natural disturbances and geologic, climatic, and ecological processes. Therefore, ecosystems restored using this strategy would be more resistant to disturbances such as fire, drought, insects, disease, erosion, and wind. It could reasonably be expected that ecosystems cared for in this way would be healthier and more productive in the long-term from all perspectives, including social, economic, and ecological.

Vegetation restoration treatments are displayed by alternative on Maps 5 and 6 and in Table 4-1 below. Table acreages are the maximum potential treatments by treatment priority and by vegetation type by alternative in the planning area within the next 15 years. The total prescribed fire, mechanical, and treatment acres represent the net potential treatment acres within projects located in priority treatment areas. These totals exclude the overlap between priority treatment areas.

Table 4-1 - Vegetation Restoration Alternatives Summary

Vegetation Priority Restoration Areas

Alternatives 2, 4, and 5	
Wildland Urban Interface (WUI)	83,727
Verified High Priority Restoration (Upper Crooked River Subbasin)	40,746
Aquatic Stronghold Restoration	29,772
Canyon Treatments	5,833
Priority Old-Growth Juniper Restoration	12,317
Ponderosa Pine	5,766
Peck's Milkvetch Treatment Area	323
Priority Sage Grouse Restoration	94,412
Mule Deer Winter Range Restoration	15,684
Alternatives 3, 6, and 7	
Wildland Urban Interface (WUI)	83,727
Verified High Priority Restoration (Upper Crooked River Subbasin)	40,746
Verified High Priority Restoration (Lower Crooked River Subbasin)	45,098
Aquatic Stronghold Restoration	29,772
Priority Old-Growth Juniper Rest.	56,611
Ponderosa Pine	5,766
Priority Sage Grouse Restoration	127,276

Vegetation Treatments by Vegetative Type (acres/year)

Alternatives 2, 4, and 5	Year 1-5	Year 6-15
Shrub-Steppe (includes young juniper)	1,464	6,605
Old-growth Juniper	2,106	821
Lodgepole Pine	7,849	2,605
Ponderosa Pine	1,131	375
Riparian/wetland/meadow	100	100
Total Mechanical	11,385	5,253
Total Prescribed Fire	1,265	5,253
Total Treatment	12,650	10,506

Alternatives 3, 6, and 7	Year 1-5	Year 6-15
Shrub-Steppe (includes young juniper)	4,074	8,642
Old-growth Juniper	2,196	3,628
Lodgepole Pine	7,849	2,605
Ponderosa Pine	1,131	375
Riparian/wetland/meadow	100	100
Total Mechanical	11,512	6,140
Total Prescribed Fire	3,838	9,210
Total Treatment	15,350	15,350

Differences in effects between the alternatives, in most cases, are directly proportional to the number of acres treated, or miles of motorized roads and trails allowed in each alternative. Where there are differences in treatment strategy between the alternatives, differing effects produced by those strategies will also be described.

The description of direct and indirect effects on vegetation in this section will focus on five major categories of activities affecting vegetation: mechanized operations, motorized recreation/travel, non-motorized recreation, prescribed fire, and site rehabilitation (including management of noxious weeds). Direct and indirect effects will be followed by a discussion of cumulative effects of all of these activities on vegetation.

Assumptions

Plant communities are naturally dynamic. While change is inevitable, human influences would have direct, indirect and cumulative effects on vegetation. The extent of these effects depends on the specific type, scale, location, timing and duration of management activities or land uses. Active vegetation management activities such as cutting, burning, planting, seeding, fertilizing, and livestock grazing tend have more direct effects on vegetation. Other management activities and land uses including, but not limited to, recreation, mining, and land ownership transfers have direct and indirect effects on vegetation. Humans have also interrupted or exacerbated natural disturbance processes such as fire, insects, and disease.

Because of complex ecosystem interactions, management activities and land uses that affect vegetation would also have indirect and off-site effects on many other biological and physical components of the environment. For example, cutting juniper trees would change the composition and structure of shrub-steppe communities, which, in turn, results in changes in the composition and distribution of certain wildlife species and changes in downstream water quality. Vegetation treatments would impact many other resources such as soils, visual quality, air, and fish. Due to these interrelationships between different resources, some of the direct, indirect, and cumulative effects of vegetation management are discussed in other sections of this chapter.

Treatment priorities and acreages are based on ecosystem and fuels management objectives and assume budget is not a major limiting factor. Because of the high fire danger in portions of the planning area, the proximity of homes and urban centers, and funding priorities within the National Fire Plan, vegetation treatment emphasis in the first five years of implementation would be within WUI areas.

Special Status Plants: It is the policy of the BLM to protect and enhance special status species and their habitats. The Endangered Species Act mandates that the BLM ensures that actions authorized or carried out by the BLM are consistent with the needs of special status species and do not contribute to the need to list any of these species as Threatened or Endangered. In addition, according to the basic provisions of FLPMA and the Interior Columbia Basin Strategy, the BLM is also committed to promoting biodiversity and assuring the survival of rare or sensitive plants through active management and habitat restoration. Therefore, all alternatives would strive to protect and enhance special status species habitat.

The greatest threat to special status plants is direct loss of habitat. Development on private land, land exchanges, high motorized recreation use levels, livestock grazing, fire exclusion, exotic weeds, and other uses and activities have all contributed to a loss of habitat in the last 150 years. All alternatives would consider the presence of special status species habitat before decisions are made on whether or not to allow certain activities or uses. If a use or activity is authorized in habitat or potential habitat, protection and mitigation measures would be applied. All alternatives would also consider the occurrence of special status plant species in land ownership transfer and land exchange

decisions. Acquisition of special status species habitat would be a priority in decisions on which parcels to bring into public ownership.

Alternatives that would designate ACECs and other Special Management Area designations would be better able to provide protection for special status species inhabiting these areas. For example, an additional burden of justification would be required to allow a new or expanded right-of-way or new mineral development within an ACEC as compared to outside of an ACEC.

Cross-country OHV traffic, trampling by livestock, and direct application of mechanical treatments or fire would damage or destroy individual plants or groups of plants, at least in the short-term. Known plant populations would generally be protected from ground-disturbing effects. However, some limited mechanical treatment or prescribed burning may be prescribed within some special status plant populations or potential habitats when overall restoration is a primary objective.

Some special status plants are tolerant, or even dependent, on a natural fire regime for regeneration. For example, pumice grapefern appears to favor open sandy areas with a minimal duff layer over heavily wooded areas with abundant shade and organic matter. Species such as the variegated desert dragonhead lily repopulate quite aggressively and actually thrive after the occurrence of fire. On the other hand, green tinged paintbrush is extremely sensitive to fire and burning would be detrimental. Therefore, a vegetation management strategy that would promote habitat diversity and transition toward historic native vegetative condition and structure would likely benefit special status species as well.

Direct short-term loss of some plants from the treatment would likely occur but the net effect to the population would be beneficial because of expected improvement in the condition of the species habitat in the long-term.

Livestock Grazing: affects vegetation by direct removal (grazing) of vegetation, and through compaction of soils from hoof traffic or from concentrated use (such as near salt blocks, shade and watering areas). Grazing effects on vegetation depend on: AUMs (the number of animals grazed), intensity (number of animals per acre), duration (length of grazing period), and season. Other than some proposed allotment closures, these grazing variables would not specifically be modified by any of the alternatives for the planning area.

Fire: Periodic natural fire cycles have been a major factor in shaping the composition, structure and distribution of all plant communities within the planning area. Today, in an effort to protect human life and property, most fire starts are suppressed. Most researchers agree that reintroduction of fire into ecosystems is essential to help maintain bio-diversity and ecological integrity of fire adapted systems. Prescribed fire includes pile burning, broadcast burning, jackpot burning, underburning, and prescribed natural fire. A prescription is written that specifies the parameters within which the burning would occur. Some of these parameters are fuel moisture, wind velocity and direction, relative humidity, and expected weather conditions. Prescribed burning is done for: reduction of natural and activity fuels, restoring proper ecological and hydrologic function, site preparation for planting or seeding, and controlling certain noxious weeds.

Agee (1993) estimates that fire burned in juniper communities approximately every 15-25 years. Today juniper may need to be cut prior to burning in areas that are deficient in fine fuels. Cutting alone may not be practical for juniper control due to the high numbers of seedlings and small saplings, and prescribed burning may be required. Fire intensity would have to be high enough to kill the standing juniper seedlings and small trees; however, localized high fire intensities may cause mortality in the perennial grasses such as Idaho fescue and bluebunch wheatgrass (Bunting, 1987). Indirect mortality from fire

on juniper may also occur from weakening the tree and causing it to become susceptible to insect attack and drought stress. Microbiotic crust cover may be reduced by fire but studies indicate that it can recover within twenty years in xeric communities and within 8 years in mesic communities (Quinsey, 1984). Maintenance burning in shrub-steppe at regular intervals of 20-30 years may be required to maintain a bitterbrush/grass or big sagebrush/grass community in a mosaic arrangement across the landscape. The required two growing seasons of rest from livestock grazing would allow better establishment of new plants following burning.

Agee (1993) estimates that fire burned in ponderosa pine communities approximately every 5-12 years. Pre-burn thinning and removal of small trees would be required in many ponderosa pine stands due to decades of fire exclusion and the current high tree density and ladder fuel arrangement. Whereas, wildfire occurring in these stand conditions would tend to be large, severe, and stand-replacing events, prescribed fire would thin additional seedlings, saplings, and intermediate sized trees through direct mortality. Growth of residual trees would accelerate within a few years with a reduction in competition. Understory grass and forb density and diversity would be greatly enhanced following light underburning. Idaho fescue, bottlebrush squirreltail, and antelope bitterbrush on many sites would respond well within 2-3 years after fire.

Site Rehabilitation: Methods of site rehabilitation of damaged sites in terms of acreage would include manual, chemical, and biological methods. Manual and biological effects on vegetation will not be discussed because they are relatively minor compared to motorized/mechanical effects. Chemical effects are already fully described in the Prineville District Integrated Weed Management Environmental Assessment (OR-053-3-062). Site rehabilitation and management of noxious weeds is commonly needed where ground disturbance such as mining, logging, road, powerline, and pipeline construction (ROWs), trespass/illegal activities, OHV cross-country travel, and user-created roads/trails has occurred. Natural events such as wildfire, soil erosion, and windthrow may also require rehabilitation. Rehabilitation of disturbed sites and management of noxious weeds restores overall ecosystem and watershed health with spin-off benefits to all other resources including soils, water quality, vegetation, wildlife, and visual quality.

Site rehabilitation and noxious weed management is often needed where a ground disturbance has occurred. Rehabilitation of disturbed sites and management of noxious weeds restores overall ecosystem and watershed health with spin-off benefits to all other resources including soils, water quality, vegetation, wildlife, and visual quality.

Shrub-Steppe (including young juniper): The most common treatments implemented in the shrub-steppe and young juniper community types would be prescribed burning and cutting juniper and shrubs by chainsaw or other mechanical means. Because mechanical treatments are more expensive, and because ecological effects are generally less desirable than those produced by fire, mechanical treatments would usually occur when prescribed fire is too risky, where fuel conditions would not allow effective use of fire, or where there is an economically viable product to harvest. On some sites, pre-burn cutting may be required to modify fuels in preparation for a more effective prescribed burn.

Most of the published literature concerning juniper ecology generally supports an inverse relationship between overstory juniper canopy cover and understory plant cover. Closed juniper stands may virtually exclude all herbaceous vegetation (Tausch and Tueller, 1990). However, effects on the understory of juniper dominated sites vary across a wide variety of sites. Increases in western juniper density appear to have the greatest effect on plant community composition and structure on sites with shallow soils or south facing slopes. On these drier sites, canopy cover of fully developed juniper woodlands frequently ranges from 20 to 30 percent with less than five percent cover of shrubs, grasses, and forbs, and nearly 70 percent bare ground (Miller and Wigand, 1994). Dramatic declines

in understory vegetation and diversity are observed when canopy cover reaches 30-35 percent, especially when there is a hardpan 12 to 24 inches below the surface (Borman, 1996). Most of the literature attributes the low understory cover on these sites to competition with juniper for limited water and nutrients. Plant species richness and seed reserves also decline as juniper dominance increases on a site (Koniak and Everett, 1982). Overall productivity of a site may be decreased when bare ground allows overland flow of water and erosion to carry away topsoil nutrients.

On sites with deeper soils and greater available soil moisture, understory vegetation seems to be better able to co-exist with fully developed juniper stands. Examples of these soil types (pumice zone) and plant associations occur in the area roughly bounded by the triangle of Bend, Sisters, and Prineville. This is the center of the area where western juniper attains its maximum development in terms of density and extent of old and large trees. In the pumice zone, as site condition decreases from late seral to early seral, late seral perennial bunchgrasses decrease while early seral species such as squirreltail and western wheatgrass increase. Rock gilia and green rabbitbrush also increase with a decline in condition. Poor condition sites are dominated by introduced annual grasses, annual forbs and rabbitbrush. Both cutting and burning on these sites appear to result in an increase in undesirable shrubs and exotic annuals.

Equipment designed to move logs and process wood products would be used on commercial forestland and woodlands where operationally and economically feasible. In general, use of this type of equipment in juniper woodlands has been very minor. Difficulties in handling and processing juniper and its inherent low value for traditional wood products have limited its commercial harvest. However, if markets, product development, or harvesting and processing technologies improve, use of this type of equipment in the juniper woodlands could increase substantially. The need to pile or remove material off-site for fuels reduction in the WUIs may also require increased use of this equipment.

Old-Growth Juniper: Mechanical treatments would be used to maintain and restore old juniper woodlands. Treatments would be less intense than those in the shrub-steppe or young juniper types. Cutting juniper would be primarily limited to younger trees (generally less than 150 years old) occupying the interspace areas between the larger, older trees. Understory vegetative response would be more subdued due to the less intensive treatments, the deeper soils and type of plant communities involved. Thinning juniper would be expected to increase the health and longevity of the remaining trees. Mechanical treatments would mimic natural processes that historically maintained these juniper woodlands in their late seral condition. Many old-growth woodland sites are close to urban centers and are occupied by exotic annuals and noxious weeds. Evaluation of sites and application of treatments to minimize the spread of noxious weeds and other exotic annuals would be integral to management of old-growth woodlands.

Each alternative designates various combinations and sizes of ACECs (see Map 7, Special Management Areas, and old-growth juniper range on Map 4, Vegetation). All proposed and existing ACECs contain some amount of old-growth juniper woodlands. In addition, alternatives that propose restricted road access and less motorized activity would reduce effects of illegal activities and ground-disturbance on old-growth juniper woodlands. Alternatives that would designate ACECs and other Special Management Areas would be better able to provide protection for old-growth juniper woodlands located within these areas. Old-growth woodlands values (and other natural/cultural ACEC values) within ACECs would have a higher priority for protection within ACECs than they would outside ACECs. Alternatives 3 and 4 designate ACECs (Juniper Woodland ACEC and Alfalfa Market Road ACEC) specifically to protect old-growth woodlands. New VRM Classifications would also favor retention of old-growth trees and improved vegetative condition.

Evaluations for the presence of old-growth woodlands and the relative quality of habitat compared with the proposed activity, use or land transfer action would be required before any decision is implemented that could effect old-growth values. If old-growth values are involved, appropriate protection, mitigation, or avoidance measures would be provided on a case-by-case basis. Some decisions involving old-growth value trade-offs may be allowed if the proposed activity or use is determined to have an overall net benefit to public land resources.

Lodgepole and Ponderosa Pine Forest: The vast majority of vegetative treatments in lodgepole and ponderosa pine forest types in the planning area would be mechanical. Because these forest types may contain an economically viable product, equipment designed for timber harvest and subsequent slash treatment would be used. Heavy fuels would be removed rather than left on site to minimize visual impacts and fire hazards. Site productivity would be maintained by leaving fine fuels scattered on-site for organic matter and nutrient soil input.

Sites selected for restoration within the pumice zone present special challenges. Cutting juniper trees in this area is usually followed by a decline in Idaho fescue, which occurs beneath the tree canopy, and is replaced by green rabbitbrush, cheatgrass, and introduced annual mustards (Miller, 2000). Priority treatment sites would be evaluated for occurrence of noxious weeds and exotic annuals to minimize potential for introduction and spread.

Forest Thinning

The predominant mechanical treatment within lodgepole and ponderosa pine forests would be thinning (cutting and/or removing only a portion of the stand). Due to the fuels reduction and restoration emphasis in the Upper Deschutes Planning Area during this planning cycle, a majority of the thinning would be in the smaller diameter size classes.

Forest Patch Cutting

Small patch cuts or "even-aged management" removes all or nearly the entire forest tree component with the goal of regenerating a new stand. Seed trees and habitat trees would be designated for reserve in the larger openings and would not be cut. Seed trees may or may not be removed later after satisfactory regeneration has become established, depending on habitat values and presence of disease. Currently, patch cuts are not needed for diversity. This silvicultural prescription would only begin to be implemented toward the end of the planning period (and beyond) and amount to a total of less than 1,000 acres over 15 years across the entire La Pine block.

Regeneration harvests result in alterations in plant community composition and structure. Removal of trees and ground disturbance from regeneration harvest and the associated microclimatic site changes causes the plant community to revert back to an earlier successional stage. When overstory trees are removed, competition is greatly reduced for sunlight, nutrients, water and growing space. These resources are then available to the understory vegetation and the next generation of trees. Early seral stage species would colonize and increase, while species preferring shade or later seral species would decrease. In some areas, increases in noxious or non-native plant species may occur. Shrubs would also increase in relative abundance and vigor. With a sequence of patch cuts over a long period of time, the forest would achieve a mosaic of stands with varying ages, canopy levels, and successional stages. The stand structure of the residual older stands in-between patch cuts would be more complex with variable tree densities, multiple canopy levels, uneven-age classes, and abundant snags and downed logs.

Effects on Insect and Disease

Management of forest insects and disease would occur primarily through silvicultural cutting and prescribed burning treatments, which alter vegetative condition. Thinning

and patch cutting can improve stand health directly by removing infected trees. Thinning can also leave the healthiest trees, which are more resistant to attack. Insects and disease can rarely be eradicated from the forest because most of these organisms evolved with the plant community and are an integral part of the ecosystem. Treatments for insects and disease would be prescribed to control outbreaks and reduce infections to endemic levels. Endemic populations of these organisms would normally cause some mortality in individual and small groups of trees. The insects and diseases of most consequence within the planning area are: dwarf mistletoe, western gall rust, root diseases and bark beetles.

Dwarf Mistletoe: In stands where the occurrence of dwarf mistletoe is low, thinning and salvage can directly remove a high percentage of this parasite by removing infected trees. Thinning can also indirectly decrease the spread of dwarf mistletoe by increasing growth rates, which enables trees to grow faster than mistletoe can spread. While infection rate could increase through improper use of thinning, this situation can be avoided by prescribing an even-aged treatment for the most severely infected stands. Large patch cuts would be the most effective means of controlling severe dwarf mistletoe infections.

Western Gall Rust and Root Diseases: Thinning and salvage treatments reduce these diseases by removing infected host trees. Thinning, however, results in some damage to the roots, stem, and branches of residual trees, and may allow infection from airborne spores. Specialized equipment, designated skid trails and strict adherence to contract specifications would limit this damage.

Bark Beetles: Thinning for density management would provide the greatest benefit in managing bark beetle population levels. The mountain pine beetle favors large, contiguous, dense stands of low vigor trees with a minimum tree diameter of 6 inches. Thinning would alter stand conditions by removing the weak and low vigor trees and increasing the vigor of the remaining stand. Patch cutting would break up large stands and introduce horizontal diversity, which would reduce the conditions conducive to a large-scale beetle epidemic.

Incomplete or Unavailable Information

There is little documentation regarding the effects of vegetative treatments and other ground-disturbing activities on the four special status plant species known to exist within the planning area. Data from studies on the effects of various simulated treatments is currently being collected for pumice grapefern and Peck's milkvetch.

Analysis of the Alternatives

Common to All Alternatives

Mechanized Operations
Mechanized equipment, regardless of the specific project, would all produce similar short-term effects on vegetation. The degree and extent of these effects, however, would vary based on type of equipment and resource objectives.

Non-motorized Use
Grazing would be guided by "Standards for Rangeland Health and Guidelines for Grazing Management," which were incorporated into the B/LP RMP in 1997. Individual grazing allotments would be evaluated for several Standards & Guidelines ecosystem and watershed health criteria. If grazing is not meeting these criteria, then livestock management such as AUMs, season of use, and grazing intensity would be adjusted.

Prescribed Fire

Specific effects of prescribed fire on vegetation include:

1. Immediate reductions in the total amount of vegetation, followed by rapid re-growth increases in density and vigor of vegetation, especially grasses and forbs. Species composition and proportions may change in the long term. Recolonization begins with a high proportion of herbaceous species. Later, over a period of years, woody species (shrubs and trees) emerge as increasingly dominant through the process of succession.
2. Reduction of some fire intolerant species and increases of some fire-tolerant or fire-dependant species. Shade intolerant species replace shade tolerant species in the short-term.
3. Changes in nutritional and physical characteristics of the soil and corresponding effects on plant growth due to a potential nutrient "flush," particularly phosphorus and potassium. Long-term net losses of nutrients and organic matter may occur with fire.
4. Reduction in the potential for intense wildfire. Prescribed burning reduces surface and ladder fuels in a controlled fashion. Wildfire in unmanaged or fire excluded areas may have severe and long-term effects on vegetation and soils.
5. Potential for introduction or spread of noxious weeds and other invasive early seral or non-native species. Examples would be knapweed, cheatgrass, mustards, thistles, and rabbitbrush. Site evaluations and application of precautionary measures such as avoidance, proper timing, weed control, native seeding, etc. would minimize this risk.
6. Changes in livestock and wildlife use patterns and distribution that would affect vegetation. Succulent plant growth after burning increases grazing. More open habitats attract pocket gophers, which increases effects on soils and plants.

Site Rehabilitation

Rehabilitation treatments and management of noxious weeds would not vary between any of the alternatives.

Prescribed fire can be an effective tool for control of noxious weeds. Fire would be used on specific sites and under situations where certain noxious weeds and other vegetation would respond according to overall restoration objectives.

Chemical herbicides could be applied on certain species of noxious weeds when other methods of control proved ineffective or prohibitively expensive. Herbicides would generally be applied in localized areas and on a relatively small acreage in any alternative. Specific treatment areas and acreages vary over time and are identified during priority setting for annual noxious weed control programs. Noxious weed treatments would generally be confined to transportation corridors such as roads, canals and utility lines. Refer to Prineville District Integrated Weed Management Environmental Assessment (OR-053-3-062) for a complete analysis of the effects of herbicide application.

General effects of chemical treatments on vegetation would include:

- Helps control growth and spread of noxious weeds and other undesirable species.
- Improves growth, survival, and condition of desirable species.
- May kill or displace some non-targeted plants and animals.

Off-site and non-target effects of chemicals would be minimized through very selective and limited use and strict compliance with District guidelines concerning handling and use of chemicals, label precautions, mitigation, stipulations, terms and conditions specified in EA #OR-053-3-062. Due to the wide variety of plant associations, ecological site conditions, and social factors, some rehabilitation treatments in some areas may be experimental and small in scope in order to assess their effects and gain site-specific knowledge of response.

Alternative 1

Mechanized Operations

Direct Effects
Approximately 50,000 acres of young juniper would be cut within the Upper Deschutes Planning Area. Approximately 30 percent of this amount has already been accomplished with prescribed burning and/or mechanized treatments in the last 15 years. The B/LP RMP does not specifically address the health and maintenance of old-growth juniper values and does not identify any treatments specifically designed to restore or enhance these woodlands.

Alternative 1 would be less successful in enhancing habitat for special status plant species because there would be fewer acres restored and more potential ground-disturbing activities allowed.

Indirect Effects
If permitted harvest of old-growth juniper were allowed to resume, or if illegal harvest continues to occur at present levels, there would be consequences to many components of the ecosystem. Even current relatively low levels of permitted or illegal harvest far exceed the capacity for replacement growth, and considering that many of the harvested trees are in the 500 to 1,000 year old range these would not be replaced in the near future. As important components of these old woodlands are removed or altered, the structure and functioning of this ecosystem changes. Large, old trees with their cavities, nesting and perching platforms, thermal cover, and other habitat characteristics are important for a variety of wildlife species. In general, removal of large and old trees reduces overall habitat diversity.

Harvest vehicles traveling off-road to gain access may cause soil displacement, compaction, and introduction or spread of exotic annuals. Soil disturbance and removal of old trees would generally result in a transition from late seral toward early seral condition. Some perennial bunchgrasses (e.g. Idaho fescue) and sagebrush would be replaced by exotic annual weeds such as cheatgrass and mustards. Rabbitbrush increases with disturbance and juniper seedlings would eventually move in to occupy space vacated by removal of older trees. Microbiotic crusts would be damaged and micro-site conditions changed to prevent recolonization.

Motorized Recreation/Travel

Direct Effects
Alternative 1 allows motorized cross-country travel in 38 percent of the planning area. Repeated use of cross-country paths where allowed, and illegally in closed areas, has resulted in the creation of hundreds of miles of unauthorized roads/trails in the planning area and a corresponding loss of vegetation in these areas.

Common to Alternatives 2 – 7

Mechanized Operations

Direct Effects
In addition to thinning, mechanized treatments would be used in the La Pine area to produce stand openings ranging in size from ¼ to 10 acres. Silviculturally, openings of ¼ to 3 acres are more properly termed "group selection." The extent of the effects would, in some cases, be proportional to the size, number, and total acreage of this type of treatment.

Due to the intensive salvage and even-aged timber management that has already occurred in the La Pine block over the last 20 years, additional even-aged management would be minor in the next 15 years. Even-age treatments (patch cuts) would be used sparingly compared to the amount of proposed thinning in all action alternatives and is intended to be phased in over a longer period of time to maintain diversity for fuels management, wildlife habitat, insect and disease management, and visual quality.

Indirect Effects
Indirect effects to vegetation would include damage and reduction by direct contact with equipment. Logging, in particular, can damage residual vegetation in a broader area. Logging equipment used for falling and skidding operations can crush understory vegetation, break branches and tops and damage stems of residual trees. These effects would be moderated by specifying low-impact equipment, logging over snow, closely monitoring operations, and by seasonal restrictions.

Heavy equipment used in thinning would cause some soil compaction and displacement with corresponding effects on plant survival and growth. Compaction and displacement could be minimized by designating skid trails, specifying low-impact equipment, logging over snow and/or frozen ground, suspending operations during periods of high soil moisture content, and closely monitoring operations. Compaction could also be reversed on some sites by scarifying skid trails, temporary roads and landings. Compaction also diminishes gradually over time through natural processes such as freeze and thaw action, root penetration and other biotic activity. For some early successional plant species, soil disturbance during mechanized harvest activities would have the effect of preparing a receptive seed bed by exposing mineral soil and reducing plant competition. For these species, disturbance aids in seed germination and survival.

Reduced shade and protective cover from removal of trees and shrubs, logs, organic matter and rocks would alter the physical and micro-climatic characteristics of the site that affects plant habitat. Wildlife and micro-biota (plant and animal) composition would also change, which would further affect plant communities. The response of the understory plant community to juniper cutting varies across a variety of sites and treatment techniques. Selected areas for juniper cutting within the planning area would be expected to show an increase in perennial forbs and grasses. If perennials are sparse or if annual weeds were abundant before treatment, juniper reduction and associated ground disturbance may open the site to increased dominance by annual grasses and forbs (Evans and Young, 1985, 1987).

Some mechanized projects are designed to produce long-term positive ecological effects. Mechanical vegetation treatments are implemented to achieve three main objectives: 1) restoration of plant communities, habitats, and watersheds; 2) reduction of natural fuels for protection of life and property; and 3) harvest of wood products. Depending on the specific treatment, equipment used, site conditions, and plant community involved, these activities have the potential to improve long-term condition, composition, and structure of vegetation. Most of the long-term vegetation changes occur with a response to a reduction of plant competition for a limited supply of sunlight, water, nutrients, and physical space. Specific vegetative response for each major community is described below.

Effects of Forest Thinning: Thinning removes surplus trees (surplus according to whatever treatment objectives are applied) that compete for space, sunlight, water and nutrients. These newly available resources are then reallocated to the fewer remaining trees in the stand. Thinning would generally target the smaller suppressed trees and trees infected with insects or disease. A few trees with severe disease or other "defects" that provide good perching or nesting habitat would be left for wildlife. Trees remaining in the stand would generally be those with the greatest vigor and least amount of disease. Improved stand health would increase long-term resistance to insect and disease attack.

Leave trees left in patch cuts or fire salvage treatments would include the healthiest available ponderosa pine, regardless of size or age. In such treatment areas, ponderosa pine would gradually increase in stand composition, extent, and vigor.

Stand structure would be changed by reducing tree density and increasing the average diameter. Vertical structural diversity may be reduced in some stands when thinning from below by removing some of the lower canopy layer. However, diversity across the landscape would be increased by applying a series of intermediate thinnings, which over time, would promote the growth of large trees.

Thinning for restoration of late and old structure ponderosa pine would be a primary purpose of forest mechanical treatments in ponderosa pine. Smaller trees would be thinned out around the larger trees to maintain or increase the stand diversity provided by this relatively scarce large tree component. Intensive radius thinning (usually at least 30 feet from the bole) around large and old legacy trees would provide a high level of protection from insects, disease and fire. Mechanical treatments for juniper and shrub reduction using other types of equipment such as brush-busters, mowers, and feller-bunchers would generally be limited to areas with slopes of zero to 30 percent or within the wildland urban interface. Direct effects and response of residual vegetation to treatments with heavy equipment would be similar to chainsaw use with the following differences:

- Track and wheel-based equipment has greater ground disturbance. See Soil effects described in this Chapter.
- Reduction of vegetation, especially using a brush-buster or mower, is greater for all types of vegetation within the path of the machine. However, mowing and other brush and tree reduction treatments in portions of the WUIs would reduce layering (ladder fuels) and convert vegetation to an earlier seral stage. In order to maintain a long-term effective fuel break within WUIs, a primary objective for WUI treatments would be to keep the understory within the first 500 to 1,000 feet adjacent to homes and major roads in perennial grasses, forbs, and low shrub.

Pre-commercial thinning would be done in areas of dense seedlings and saplings greater than 2 feet in height. Some commercial removal would be done where marketable material occurs in thinning of trees, mostly in the 4 to 12 inch DBH size class. Additional larger trees would be removed, generally where they pose a hazard to life or property; where they occur within an approved development, such as a new right-of-way; or where they are competing with other desirable species such as ponderosa pine or riparian hardwoods.

Restoration of old forest structure in ponderosa pine would be accomplished incrementally over a period of decades. As competing lodgepole pine, juniper, and smaller ponderosa pine are thinned out, the remaining ponderosa pine would respond with accelerated growth. Large diameter trees would be the first component of old forest structure to be restored. Large snags, downed logs, tree bole decay, and other more complex physical attributes and processes of an old forest would take much longer to develop. Each treatment entry would be designed to incrementally work toward restoration of ponderosa pine ecosystems more representative of those occurring historically.

Salvage treatments cut and/or remove dead, dying, diseased, damaged, or deteriorating trees, as well as those susceptible to attack by insects and pathogens. Salvage can reduce the rate of spread of forest pests and recover some economic value. This type of harvest can decrease stand diversity by removing dead standing and down woody material and defective trees, which provide habitat for some wildlife species. This effect would be mitigated by retaining some dead, defective and dying trees to serve as snags, replacement snags, and downed log habitat for wildlife. Retaining some diseased and

defective trees would result in a slight decline in current and potential future timber production. Conversely, thinning increases growth and yield for future potential forest products production.

When reforestation is prescribed either by planting or natural regeneration, ponderosa pine would be favored over other tree species on appropriate sites. Follow-up pre-commercial thinning would also remove competing lodgepole pine and juniper. Leave trees left in patch cuts or fire salvage treatments would include the healthiest available ponderosa pine, regardless of size or age. In such treatment areas, ponderosa pine would gradually increase in stand composition and vigor.

Motorized Recreation/Travel

Direct Effects
Under Alternatives 2-7 recreational and passenger vehicles would be required to stay on designated roads and trails except when riding/driving in designated "play" areas or staging areas. Assuming motorized recreation and travel actually occurs on roads and trails and according to regulations, effects on vegetation would be confined to the actual mileage of the road and trail system. Effects that occur within the width of the constructed road or trail would be similar to those described for mechanized operations in terms of direct damage to vegetation and roots and compaction to soils. Alternatives 2-7 would designate a road and trail system that would be designed and located to avoid riparian areas, special status plants, or other sensitive vegetative habitats. In addition, Alternatives 2-7 would close and rehabilitate many existing non-designated roads and trails and return these areas to a productive condition. Assuming future cross-country travel can be better controlled, road and trail closures and rehabilitation would reduce the overall area of disturbance to vegetation.

Indirect Effects
The lack of a designated roads and trail system has resulted in high and/or increasing road and trail densities and a corresponding loss of vegetation in these areas. Some, but not all, of these effects can be reduced with an Open/Closed/Limited designation, redesigned road and trail networks, and rehabilitation measures.

Designating a reduced road system and associated physical and seasonal closures of some existing roads could also limit vegetation and fuels treatment operations. In any given area, most existing roads would normally be used for projects such as tree thinning, timber harvest, brush mowing, and firewood gathering. Alternatives 2-7 would likely result in additional contract costs for vegetation treatments because contracted crews may be required to walk or drive farther to gain access a project area. In some cases, existing closed roads may be re-opened to gain administrative access for projects, adding cost and time to accomplish contract work. The more limited access and/or additional costs incurred would also apply to collection of some special forest and range products such as juniper boughs and personal-use firewood and post/pole cutting. The additional monetary costs and time would be directly proportional to the amount of closures proposed under Alternatives 2-7 and may be estimated based on number of acres proposed for open/closed/limited designations.

Non-motorized Recreation

Indirect Effects
There would also be effects on vegetation from non-motorized activities such as hiking, mountain biking, horseback riding, carriage driving, hunting, dispersed camping, and livestock grazing. These effects, though relatively low, do contribute to the overall effects of human activities. User-created, non-motorized recreational trails and/or concentrated uses over a large area can damage vegetation and cause effects similar to those described for motorized activities. These effects are currently occurring in some areas, including

Smith Rock, Redmond Caves, Cline Buttes, Horse Ridge, the Deschutes River corridor and other areas close to urban centers. Some non-motorized uses like "extreme mountain biking" and non-motorized racing events are gaining in popularity and have potential to affect vegetation because they tend to concentrate use or occur in sensitive areas such as canyons and near rivers. Most of the effects of non-motorized activities would be reduced by developing various levels of trail systems for different motorized and non-motorized activities.

Site Rehabilitation (including noxious weeds)

Indirect Effects
Noxious weed treatments would generally be confined to transportation corridors such as roads, canals and utility lines. Typical application methods include manual back-pack sprayers, and trucks/OHVs equipped with tanks and boom or hand wands. Other possible reasons for chemical use within the planning area could include: release of planted seedlings from brush and grass competition, use of pesticides for control of insects and disease on local areas of importance, fertilizers for rehabilitation of mining and other severely disturbed sites, and repellents for protecting planted seedlings from wildlife and livestock.

General effects of chemical treatments on vegetation would include:
- Helps control growth and spread of noxious weeds and other undesirable species.
- Improves growth, survival, and condition of desirable species.
- May kill or displace some non-targeted plants and animals.

Off-site and non-target effects of chemicals would be minimized through very selective and limited use and strict compliance with District guidelines concerning handling and use of chemicals, label precautions, mitigation, stipulations, terms and conditions specified in EA #OR-053-3-062. Due to the wide variety of plant associations, ecological site conditions, and social factors, some rehabilitation treatments in some areas may be experimental and small in scope in order to assess their effects and gain site-specific knowledge of response. This knowledge would then be applied to future similar treatments on a larger scale.

Alternatives 2, 4, and 5

Mechanized Operations

Direct Effects
Alternatives 2, 4, 5 would treat a total of approximately 73,370 acres of shrub-steppe habitat over the next 15 years or an average of 4,891 acres per year. Of that total approximately 65 percent would be treated mechanically. Treatment units outside the WUIs would be smaller and more focused on achieving specific resource objectives. Individual old juniper trees would be left scattered within units. Young juniper would be left to provide connectivity corridors between treatment units, screening from recreation areas and population centers, and cover patches for big-game hiding cover.

Alternatives 2, 4, and 5 would treat a total of 18,740 acres of old-growth juniper over the next 15 years or an average of 1,249 acres per year for WUI treatments and resource needs. Treatments would be by mechanical means for an estimated 90 percent of these acres in order to avoid killing or damaging old-growth trees. Prescribed fire would be used in approximately 10 percent of the old-growth range where there are large shrub-steppe openings or on stand edges where it is impractical to construct fire breaks. Juniper trees may be harvested for wood products where economically feasible and where consistent with other resource needs during or following restoration treatments. Some old-growth trees may also be harvested during authorized land clearing projects such as new or expanded ROWs and before R&PP land transfers.

If special status plants are located, appropriate protection, mitigation, or avoidance measures would be made on a case-by-case basis. Small populations or individual plants could escape survey detection or future potential habitat could be compromised when an activity or use is authorized, but, generally, all four species of special status plants would be protected and habitats would be improved in these alternatives. Alternative 5 in particular would expand the existing Peck's milkvetch ACEC by 11,144 acres. In addition, the Tumalo Canals ACEC in Alternatives 2, and 5 and the Juniper Woodlands ACEC in Alternative 4 would provide an additional level of protection for an unknown acreage of the eastern fringe (east of Barr Road) of the currently identified habitat range of Peck's milkvetch.

These alternatives would thin a total of 74,700 acres of ponderosa and lodgepole pine over the next 15 years or an average of 4,980 acres per year, all within WUIs. Many areas would have more than one entry over this time frame to treat different stand components (i.e. precommercial thinning, understory and intermediate tree thinning, brush cutting). Up to 10 percent of the ponderosa pine (approximately 940 acres) could be treated with prescribed fire (with or without mechanical pre-treatment) where smoke and risk can be adequately managed. The remainder would be treated mechanically due to the proximity of homes near the forest vegetation type. In mixed ponderosa/lodgepole pine stands, thinning would be to a lower intensity so stand density would be higher in this alternative than in Alternatives 3, 6 and 7. Average tree diameter would be less and lodgepole pine would occupy an intermediate or co-dominant status with ponderosa pine in most stands. There would be a two or three layer canopy in most mixed stands except within the first band (closest to homes) of WUIs, where stands would be treated for a one layer canopy structure.

Alternatives 3, 6, and 7

Mechanized Operations

Direct Effects
Alternatives 3, 6 and 7 would treat a total of approximately 106,790 acres of shrub-steppe habitat over the next 15 years or an average of 7,119 acres per year. Of that total, approximately 52 percent would be treated mechanically. Treatment units in these three alternatives would generally be larger, more intensive, and designed for landscape-scale restoration of major plant community types. An estimated 70-80 percent of the young juniper (less than 150 years old) within the planning area would be cut and/or burned in the next 15 years. Individual old juniper trees would be left scattered across the landscape with few cover patches of young juniper.

Approximately 47,260 acres of old growth juniper would be treated over the next 15 years, or an average of 3,151 acres per year for WUI treatments and broad area woodland restoration. Treatments would be by mechanical means for an estimated 90 percent of these acres in order to avoid killing or damaging old-growth trees. Prescribed fire would be used in approximately 10 percent of the old-growth range where there are large shrub-steppe openings or on stand edges where it is impractical to construct fire breaks. Juniper trees may be harvested for wood products where economically feasible and where consistent with other resource needs during or following restoration treatments. Some old-growth trees may also be harvested during authorized land clearing projects such as new or expanded ROWs and prior to R&PP land transfers. In addition, designated areas east of SR 27 would be made available to harvest old-growth trees up to 18 inches DBH for furniture wood, lamps, and other specialty products.

If special status plants are located, appropriate protection, mitigation, or avoidance measures would be made on a case-by-case basis. Small populations or individual plants could escape survey detection or future potential habitat could be compromised when an activity or use is authorized, but generally, all four species of special status plants would

be protected and habitats would be improved in these alternatives. Alternative 6 would expand the existing Peck's milkvetch ACEC by 11,144 acres. Alternative 7 would expand the existing Peck's milkvetch ACEC by 10,154 acres. The Tumalo Canals ACEC in 6, 7 would provide an additional level of protection for an unknown acreage of the eastern fringe (east of Barr Road) of the currently identified habitat range of Peck's milkvetch.

Alternatives 3, 6 and 7 would thin approximately the same acreage of ponderosa and lodgepole pine as Alternatives 2, 4, and 5, except that treatments to restore ponderosa pine would be more aggressive. A higher percentage of competing lodgepole pine and juniper would be removed, sites would be thinned to a wider spacing to maintain and promote larger trees, and more stand edge would be treated to extend the range of ponderosa pine. Ponderosa pine leave trees would include the healthiest trees available, regardless of size or age, and larger lodgepole pine may be cut in favor of smaller ponderosa pine. Ponderosa pine would gradually increase in stand composition, extent, and vigor. The result, over time, would be more open stands with fewer ponderosa pine per acre but with a larger average diameter per tree. Treated mixed stands would transition more to pure ponderosa pine in the interior, with occasional lodgepole pine in the understory and mixed with ponderosa on the stand edges. More intensive thinning would provide a greater measure of protection from bark beetle outbreaks. Compared to Alternatives 2, 4, and 5, due to more intensive thinning, understory vegetation would be more diverse with a higher percentage of grasses and forbs. Bitterbrush (except in the WUI) and Idaho fescue would be more abundant and vigorous.

Alternatives 3, 6 and 7 would provide better protection against insects and disease by thinning more acres and thinning to a higher intensity than Alternatives 1, 2, 4, and 5.

Alternatives 3, 6, and 7 would promote habitat diversity and transition toward historic native vegetative condition and structure that would likely benefit special status plant species.

Cumulative Effects of Mechanical, Motorized, and Prescribed Fire on Vegetation

There are complex interrelationships between biotic and abiotic components of forest, woodland, and range plant communities. Natural and human-induced processes transcend ownership boundaries. Effects, existing and future, on the local level would contribute to existing and future effects on adjacent lands. Cumulative effects of vegetation changes would occur on other resources such as wildlife, fish, visual quality, and watersheds. Effects of new vegetative treatments would contribute to the effects of older vegetative treatments, both on BLM land and on adjacent private and other public ownerships. These effects would be mitigated somewhat by the separation in time and space between earlier treatments and the new treatments.

Extensive removal of juniper, even-aged forest management, and some of the more intensive WUI treatments would result in substantial and long-term changes to the ecosystem. In these areas, successive treatments would allow early seral grass and shrub communities to dominate or co-dominate. Multiple conifer thinnings over decades would accelerate growth rates and greatly affect the residual stand structure. Thinned forest stands would begin displaying old and late-successional stage characteristics earlier than unmanaged stands. Cumulative effects on wildlife habitat could be both beneficial and detrimental depending on the specific species involved. Generally, wildlife diversity and abundance would be expected to increase over time. Watershed, overall ecological function, and visual quality would also be expected to improve.

Large and old trees have been selectively cut throughout history within the planning area. Adjacent ownerships, through urban development or timber harvest, have

also removed a high percentage of old-growth, particularly on private land. Under Alternative 1 harvest would still be allowed. Illegal cutting of old-growth juniper continues in the planning area at the rate of an estimated few hundred trees per year. Large and old ponderosa pine are being stressed or killed from the effects of competing lodgepole pine and juniper.

A net export of biomass from some sites could occur with large-scale juniper cutting/harvest or broadcast burning and with successive pine thinning/harvest or underburning. These activities would cause a decrease in organic matter and nutrients, possibly resulting in a slight degradation of site quality over the long-term. Nitrogen losses would be greater with prescribed fire than with timber harvest. Research addressing the effects of multiple rotation timber harvest on site quality is lacking, so the extent of this effect is unknown. This effect could be offset, at least partially, by applying fertilizers in specific areas and specific situations (such as wildfire or mining rehabilitation), limiting prescribed fire, or by leaving fine woody material (tops, branches, foliage) on-site during harvest for organic matter retention and nutrient cycling. Needles and fine branches contain a majority of the nutrients in a tree as compared to the bole wood. Whole trees or limbs and tops could be left on-site to produce the following benefits:

- Provide a source of nutrients for cycling back into the system over time as this material decomposes.
- Retain organic matter on-site, which provides habitat for soil invertebrates and microbial activity and aids in the development of soil structure and texture that is beneficial to plant growth.
- Ameliorates microclimatic extremes of hot and cold for improved establishment and protection of plant seedlings.
- Provides direct physical protection of low profile plants and the soil surface to reduce erosion by wind and water.
- Discourages unauthorized motorized cross-country travel and associated effects on vegetation and soils.

Cutting trees and shrubs (or mortality by any means) ceases carbon dioxide assimilation and begins the relatively lengthy process of carbon dioxide release back into the atmosphere through decomposition by microbial activity. In xeric ecosystems such as those occurring in the planning area, the vegetation decomposition process occurs over a period of a few to several decades or longer depending on the size and species of material, temperature, contact with moisture and other variables. Burning woody material, either through wildfire, prescribed fire, or generation of energy greatly accelerates the process of carbon decomposition. Biomass carbon combines with atmospheric oxygen during the combustion process to immediately release carbon dioxide into the atmosphere.

At the same time, vegetation stores carbon in a stable solid form (sequestration) in plant biomass. The amount of carbon sequestered at a site reflects the long-term balance between carbon uptake and release. Therefore, within the planning area, the carbon sequestration effects of cutting and thinning conifers, and cutting shrubs is offset by the increased growth of remaining/replacement understory grasses, forbs, shrubs and leave trees (See Vegetation Specialist Report for additional information on nutrient cycling).

Alternatives 3, 6 and 7 would be most effective in reducing or reversing cumulative effects due to the emphasis on restoration toward historic conditions and range of major vegetative community types. Sagebrush-steppe condition and structure (and habitat for associated wildlife species) would be best improved. Health, longevity, and range of old-growth juniper and ponderosa pine would be best enhanced under these alternatives.

Soils

Summary

This section will describe the effects on soils caused by ground-based management activities and land uses occurring within the planning area. The majority of effects to soils can be attributed to the use of motorized vehicles and mechanized equipment. For the purposes of this discussion, activities that normally cause effects to soils will be broken out into the following categories: mechanized operations, site rehabilitation, prescribed fire, motorized recreation, and non-motorized activities.

Since all the alternatives allow some level of all activities and land uses discussed here, the difference in effects to soils between the alternatives depends on the amount of activities allowed. The number of controlled road access points for the public entering BLM administered public lands and the density and configuration of designated road and trail systems is a major determinant of the amount and extent of effects on soils. Other potentially soil-disturbing activities, such as mining, ROW development for utilities and roads, grazing, and range improvements do not vary substantially between the alternatives.

The amount and location of vegetation restoration and fuels treatments, especially mechanized treatments, also determines the amount and extent of short-term soil effects and long-term watershed benefits. A relative comparison of effects between alternatives can be made based on the amount of disturbed/treated area in proposed vegetative and fuels treatments and expected post-treatment vegetative response (see effects discussion under Vegetation and Hydrology).

Based on these criteria, Alternatives 3, 6, and 7 would have the least effect on soils in terms of disturbance and compaction from motorized recreation/travel since these alternatives close 19 percent, 20 percent, and 23 percent of the planning area to motorized vehicles respectively. By contrast, Alternatives 1, 2, 4, and 5 close 2 percent, 5 percent, 6 percent, and 12 percent respectively. The remainder of the planning area in Alternatives 2-7 is limited to motorized use on designated roads and trails year-round or seasonally. Alternative 1 limits motorized use to roads and trails on 42 percent of the area, leaving 38 percent as Open. The open designation does not have any limitations on motorized use. Therefore, Alternative 1 allows motor vehicles to legally travel "cross-country" over a large area, which would allow a much greater level of effects than any of the other alternatives.

Alternatives 3, 6, and 7 would proposed the highest amount of vegetative and fuels treatments over a 15 year period at 230,250 acres compared with Alternative 1 at 71,000 acres, and Alternatives 2, 4, and 5 at 168,310 acres. These mechanized and prescribed fire treatments would have the highest potential to cause short-term effects on soils in Alternatives 3, 6, and 7 since they treat the most acres. On the other hand, these alternatives would also improve the long-term condition, diversity, structure, and density of ground cover vegetation. Therefore, the benefits of long-term vegetation restoration and fuels management on long-term watershed condition and function, and hence, soil stability, would indicate that Alternatives 3, 6, and 7 would have the greatest net positive effect on soils.

Refer to Table 2-1, Comparison of Alternatives, for additional detailed information on recreation access, vegetation treatments, fuels reduction, and other management activities that would potentially affect soils.

Assumptions

Effects will be described assuming the implementation of standard protection and mitigation measures associated with authorized activities. For example, mechanized

operations would include provisions for season of operation, low-impact equipment, and restricted operations in riparian areas, steep slopes, and other sensitive areas (see Appendix F, Best Management Practices). Recreational effects would include proposed allocations and guidelines such as designated areas, designated trails, and season of use restrictions (see Recreation Alternative descriptions).

An assumption would also be made that, under Alternatives 2-7, roads and trails would be engineered and maintained to minimize effects on watersheds and soils.

Effects of alternatives on soils and differences between alternatives are difficult to estimate and quantify. The effects that could be quantified include area of surface disturbance (acres), amount of roads and trails (miles), soil bulk density (grams per cubic centimeter), and condition and density of vegetation. The most practicable measure of soil effects, therefore, would be the amount of open, closed, and limited designations for motorized travel allowed under each of the alternatives.

Illegal activities such as dumping, illegal firewood cutting, "homesteading," and other activities that involve operating a motor vehicle off designated roads and trails have been a serious problem in the past and will likely remain a long-term problem. Some management actions, particularly road closures and limited access points may help control some of these activities.

Effects described in this section apply to all soils in the planning area to varying degrees. The soil mapping units shown on Map S-46. Soils, and described in Chapter 2 – Affected Environment describe the specific soils that are more subject to accelerated rates of erosion due to water or wind. Generally, soils that have more of a loamy surface horizon combined with steeper slopes are the soils more prone to erosion by water. Soils that contain a high level of sands, loamy coarse sands, and sandy loams mixed with pumice-ash in surface textures are especially prone to wind erosion.

See also the effects discussion under Vegetation and Watershed/Hydrology sections for other indirect effects closely related to those for soils.

Incomplete or Unavailable Information

An accurate estimate of the amount of roads and trails under each alternative is unavailable at this time. Soil bulk density is a very intensive sampling technique for compaction that would be done only during monitoring for certain high impact activities.

The quantity of soil losses due to water and wind erosion is difficult to measure. There is no information available for the planning area to determine soil loss of various watershed and vegetative conditions or erosion cause by specific types of activities or treatments.

Analysis of the Alternatives

Common to All Alternatives

Indirect Effects

Mechanized Operations
Activities utilizing mechanized equipment include mining, road construction, logging, fuels treatments, restoration treatments, utility and other facilities development, prescribed burning, and other authorized as well as illegal activities. Equipment is usually wheel- or track-mounted in various configurations and with various specialized attachments or implements.

Mechanized equipment affects soils by displacing surface layers and compaction.

Subsequent effects are the result of displacement, compaction, and damage to or removal of vegetation. Soil disturbance and displacement from motor vehicles and equipment accelerates both wind and water erosion. Vehicle speed and weight (ground pressure in pounds per square inch) is a factor in how much displacement occurs. Energy from motor vehicles is absorbed either through soil compaction or shear stress in the upper soil profile. As a general principle, for a given applied stress, compaction (compression) occurs before shearing. While less compaction occurs at greater vehicle speed, more speed generally produces greater surface disturbance. More disturbance increases soil losses through direct soil movement and wind erosion or "dust." Drier soil conditions result in more dust and greater wind losses, while more soil moisture results in more severe compaction.

Compaction is also increased with heavier equipment under full power, such as a skidder traveling uphill pulling a load of logs. Compaction diminishes infiltration capability. When water is not readily absorbed into the soil, runoff occurs and removes surface soils either through sheet erosion or rill and gully erosion. Compaction and displacement can also modify long-term surface runoff patterns. Further indirect and off-site effects of soil erosion occur with downstream sedimentation and changes in hydrologic function (see Environmental Consequences – Hydrology for further effects of soil erosion).

Motor vehicles and equipment operating off-road or off-trail damages vegetation by breaking, trampling, and crushing foliage and roots. Microbiotic crusts (a mat of algae, moss, lichen, and fungi) are particularly fragile and vulnerable to mechanical damage. A single pass with a motor vehicle can destroy fully developed microbiotic crusts on sandy soil. Repeated operations or travel in concentrated areas damages vegetation beyond its ability to recover, eventually resulting in the near total elimination of all protective vegetative cover and organic matter. This effect is especially pronounced on the drier, low productivity sites typical of Central Oregon.

Since the planning area is predominantly flat or moderately sloped, wind erosion is a relatively substantial source of soil loss. Soil type and high levels of human use in the area exacerbate losses to wind. Repeated passes with motor vehicles on these soils, particularly during dry and windy conditions, result in generation of high amounts of airborne dust. Much of this material is blown off-site and is deposited elsewhere.

Some preventative and rehabilitation measures would be applied to limit or partially reverse direct and indirect effects to soils and vegetation. Temporary roads, landings, staging areas, and other affected sites can be rehabilitated by mechanical treatments, such as recontouring and ripping followed by seeding and mulching. Installation of waterbars on roads and trails would divert and disperse water runoff before rilling and gullying can occur. Seeding and fertilizing would accelerate the re-establishment of plant cover.

With area and road/trail closures, natural processes of recovery from soil disturbance would also occur gradually over time. Processes such as freeze and thaw action, wetting and drying, root penetration, root decomposition, burrowing by rodents and invertebrates, and other soil flora and fauna activity all combine to reduce compaction. Natural seeding and plant growth would eventually revegetate impacted sites. Plant growth and re-establishment is slow in Central Oregon, so full recovery through natural means could take decades.

Site Rehabilitation

Long-term changes in vegetative structure, composition, and condition diminish the ability of vegetation to hold the soil in place and protect it from the effects of wind and water. Changes in micro-site conditions also greatly affect the abundance, health, and diversity of soil micro-organisms, insects, and burrowing rodents. These organisms are very sensitive to changes in temperature, moisture, and nutrients. Soil organisms play an important role in soil development processes (i.e., nutrient cycling, aeration, water

retention, and development of soil structure). Loss of living biota and organic litter impairs soil infiltration capability and water holding capacity.

Conversely, proposed treatments that maintain and restore vegetation, especially ground cover vegetation would have beneficial effects to soils and long-term watershed health. Roots hold soil in place and foliage dissipates and disperses raindrop impact and overland flow of water. Litter and other organic matter deposition protect the soil surface from erosive forces and improve soil structure, texture and fertility. Nutrients are bound in organic matter and are slowly released through decomposition over a long period of time. Nutrient cycling is more efficient and occurs in the portion of the soil profile that is more readily accessible to plants. Healthy and diverse vegetation also increases the abundance and diversity of soil micro- and macro-fauna, which, in turn, help in organic matter decomposition and soil aeration and development (see the discussion under Hydrology for larger-scale effects of vegetation treatments on watershed function, water quality, and soil conservation).

The effects of soil loss and compaction are also manifested in reduction of long-term site productivity. When the surface layers of soil are removed through displacement and erosion, nutrients and organic matter, which are concentrated in this zone, are lost. Loss of soil nutrients reduces density, vigor, and diversity of protective plant cover. Compaction and loss of surface cover reduces infiltration and storage of water needed for plant growth. Compaction can also limit growth and survival of plants by decreasing the amount of pore space and available oxygen in the soil and by physically impeding root penetration. Interference with plant physiological processes can have a significant effect on the rate of site recovery. The net result can be further changes in soil structure and long-term losses of soil fertility.

Prescribed Fire

Prescribed fire also has direct and indirect effects to soils. Direct effects result from the loss of protective organic matter (i.e. live and dead vegetation), microbiotic crusts, and changes in the physical and chemical characteristics of the soil surface. These effects are directly proportional to the fire intensity and duration. High fire intensity or duration may cause some soils to become hydrophobic (water repellant), which impedes infiltration and increases surface runoff. Other direct and indirect effects are similar to mechanical effects with the exception of compaction. Volatilization of nutrients may have additional long-term consequences to site productivity. Germination, vigor, and spread of some noxious weed species and introduced annuals are more pronounced following fire. Fire applied in inappropriate locations can allow these undesirable plant species to increase or spread, allowing increased soil losses compared to healthy native vegetation. One consequence of not treating fuels by prescribed fire or mechanical means, on the other hand, could be large and high-intensity wildfires, which could have severe and far-reaching soil and watershed effects (see Fire Management effects).

Motorized Recreation/Travel

Motorized recreation and travel includes the use of motorcycles, “quads,” full-sized 4-wheel drive and passenger vehicles. Under Alternatives 2-7, recreational and passenger vehicles would be required to stay on designated roads and trails except when riding or driving in designated “play” areas or staging areas. Assuming motorized recreation and travel actually occurs on roads and trails and according to regulations, effects on soils in terms of area would be confined to the actual mileage of the road and trail system. Effects occurring within the width of the actual road or trail would be similar to those described for mechanized activities in terms of compaction and soil displacement. Alternatives 2-7 would designate a road and trail system that would be designed and located to avoid sensitive soils, steep pitches, riparian, and other areas or situations that could cause substantial erosion. Maintenance of the designated road and trail system

would also manage surface run-off and minimize the potential for erosion. In addition, Alternatives 2-7 would close and rehabilitate many existing hillclimbs and other non-designated roads and trails.

OHVs have some effects on soils that are slightly different than other mechanized/motorized travel. With OHVs, speed is often a factor. Spinning wheels, high speed turns, hard acceleration, hill climbing and travel during very wet or very dry soil conditions can cause additional disturbance. Repeated use of cross-country paths by motorized recreationists and travelers, particularly near population centers, has resulted in the creation of hundreds of miles of unauthorized roads/trails and a corresponding loss of vegetation in these areas. Some, but not all, of these effects can be reduced with open/closed/limited designations, redesigned road and trail networks, and rehabilitation measures (as described under "Mechanized Operations" above). Proposed directional signs and numbers for major roads/trails would also help recreationists and the general public navigate more efficiently.

Non-Motorized Activities

There would also be effects on soils from non-motorized activities such as hiking, mountain biking, horseback riding, carriage driving, hunting, dispersed camping, and livestock grazing. Uncontrolled non-motorized use such as user-created recreational trails on steep slopes or concentrated use over a large area can lead to compaction, displacement, and erosion effects similar to those described for motorized activities. These effects are currently occurring in some areas such as Smith Rock, Redmond Caves, Cline Buttes, Horse Ridge, the Deschutes River corridor and other areas close to urban centers. Some non-motorized uses like "extreme mountain biking" and non-motorized racing events are gaining in popularity. These uses have potential to affect soils because they tend to occur at a higher activity level or on steep slopes that are more prone to erosion. Most of the effects of non-motorized activities would be reduced with all action alternatives in this plan through various levels of trail system development for different motorized and non-motorized activities. In some areas, horses and mountain bikes would be required to stay on trails.

Livestock Grazing

Livestock grazing affects soils through compaction by hoof traffic and through the removal of vegetation from grazing and concentrated use (such as near salt blocks, shade and watering areas). Grazing effects on soils are directly proportional to AUMs (the number of animals grazed), intensity (number of animals per acre), duration (length of grazing period), and season. Other than some proposed allotment closures, these grazing variables would not specifically be modified by any of the alternatives for the planning area. Grazing would be guided by "Standards for Rangeland Health and Guidelines for Grazing Management," which were incorporated into the B/LP RMP. Individual grazing allotments would be evaluated for several Standards and Guides ecosystem and watershed health criteria. If grazing is not meeting these criteria, then livestock management, such as AUMs, season of use, and grazing intensity, would be adjusted.

Cumulative Effects

Cumulative effects on soils would occur over time with the combined effects of all of the activities described above; both within the planning area and on all ownerships outside the planning area but within the same watershed. Ground-disturbing activities and fire occurring upslope could contribute to cumulative changes in hydrologic function, including erosion, stream sedimentation, and water quality occurring within and downstream of the planning area (see Hydrology for a more detailed discussion of cumulative effects of soil erosion). The net result to soils could be further compaction, physical losses of soil, changes in soil structure, and potential long-term losses of soil fertility as described above. With better managed public uses, rehabilitation, and natural recovery processes as described above, these cumulative effects would be moderated and stabilized over time.

Wildlife

Summary

Emphasis Areas
The Allocation of areas to be managed with a primary or secondary emphasis for wildlife does not always mean that the management guidelines will be strictly applied to a specific area for the species identified, especially in regards to secondary emphasis. In some alternatives where seasonal closures are used to mitigate the effects of motorized travel, the closure period would include only part of the season of use for one or more of the target species. This situation complicates the comparisons between the alternatives. The Transportation Management Designations maps (Maps 8 – 14) need to be consulted to better understand the relationships between the primary and secondary emphasis for wildlife and the applicable management guidelines that apply.

Transportation Management Assessment
This analysis only considers the allocation of arterial and collector roads and does not give a complete picture of the effects and management implications, especially as it relates to the management of local roads. However, this assessment does provide an indication of the direction the alternatives are providing land management decisions and the amount of ability the BLM has in managing for wildlife resources, given the existing land ownership patterns and the existence of non-BLM roads.

Sage Grouse
When comparing the average effects of motorized travel routes across the entire planning area, Alternatives 3-7 would provide 19 percent higher habitat effectiveness (HE) than Alternatives 1 and 2. The largest differences occur in the North Millican (+22 percent) and Horse Ridge (+16 percent) areas; however, South Millican has a considerable difference as well (+10 percent). North Millican appears to have the ability to achieve a high (71 percent) habitat effectiveness; however, this area is also identified to provide OHV trails that are not considered in The HE calculations. In order to achieve a primary emphasis for sage grouse and provide a reasonable trail network a large amount of arterial, collector and local roads would have to be closed seasonally as well as permanently. The difference in approaches to managing young juniper trees growing in shrub-steppe habitats between the "historic" (Alternatives 3, 6 and 7) and the "current" (Alternatives 2, 4 and 5) themes also creates complications to achieving desirable habitat effectiveness for sage grouse management. This complication is exacerbated by the recreational interest in retaining juniper trees (which degrades sage grouse habitats) for management of the OHV trail system.

In Alternatives 2, 4 and 5, recreational interests would receive priority consideration before wildlife in terms of managing young juniper trees. In Alternatives 3 and 6, wildlife interests (sage grouse) would receive priority consideration before recreation. Alternative 7 would take a similar approach to Alternatives 3 and 6, in terms of managing with the "historic" theme and generally favors sage grouse (shrub-steppe) habitat maintenance and restoration. However, Alternative 7 would also take an adaptive management approach at meeting both wildlife and recreational needs in the North Millican geographic area.

Mule Deer
When comparing the average effects of motorized travel routes across the entire planning area, Alternatives 3-7 would provide 11 percent higher HE than Alternatives 1 and 2. The largest differences occur in the Mayfield (+33 percent), Horse Ridge (+21 percent), North Millican (+21 percent) areas; however, Cline Buttes and the Northwest also identify substantial increases in HE. Cline Buttes, however, is identified in some alternatives to also manage for OHV trail use, such as in Alternative 7. Alternative 7 also provides some primary and secondary wildlife emphasis in parts of the Cline Buttes area. In Steamboat

Rock, Prineville and Prineville Reservoir geographic areas, Alternatives 3-7 show a lower HE in comparison with Alternatives 1 and 2. Steamboat Rock has a considerably (-12 percent) lower HE in Alternatives 3-7, but still shows it at 72 percent. As in other situations, local roads and OHV designations need to be considered before knowing the significance of any listed HE score.

Rocky Mountain Elk

When comparing the average effects of motorized travel routes across the entire planning area Alternatives 3-7 would provide 12 percent higher HE than Alternatives 1 and 2. The largest differences occur in the Horse Ridge (+23 percent), North Millican (+27 percent) and La Pine (+18 percent) areas. Mayfield lists a significant higher HE in Alternatives 3-7; however, there are only 441 acres of elk habitat in that geographic area. As stated earlier, the North Millican area sometimes is identified for managing for both OHV trail use and primary wildlife emphasis and can create difficult and complicated management implications. Some alternatives, such as 3, 4, 5 and 6, use seasonal use periods for OHV use in order to avoid the impacts to wintering animals. Seasonal use periods may provide a more effective method to managing for high HE than trying to limit the amounts of roads and OHV trails in areas identified for OHV use.

Pronghorn

The assessment for Pronghorn was done slightly different than for deer, elk and sage grouse, and therefore will be discussed in a slightly different manner. The comparisons are made relative to the amount of habitat that is influenced by roads (arterial and collectors) and having a lower road influence percentage is better for pronghorn than a higher one.

Alternatives 3-7 would provide the lowest disturbance influence on pronghorn when comparing the average effects of motorized travel routes across the entire planning area. The Badlands provides the most stable habitat emphasis between the alternatives, but only has 9380 acres. Horse Ridge contains over 19,000 acres and in Alternatives 3-7, only 8 percent of the habitat falls within the influence zone of roads. This is a 24 percent decrease from alternatives and 2. The Millican Plateau contains the largest amount (41,236 acres) of BLM administered lands that are suitable pronghorn habitats, and this area also has winter range. In the Millican Plateau area, roads in Alternatives 1 and 2 would have a 33 percent level of influence on pronghorn habitats. This area is also part of the existing Millican OHV area and the trails would increase the level of influence that motorized vehicles have on pronghorn. Alternative 7 provides the least amount of habitat in this geographic area in a primary or secondary emphasis level, which includes winter range.

There are a few additional situations that are contributing both impacts to wildlife resources and habitat opportunities located both within the plan area boundary on private, state and county lands, and outside the planning area boundary on adjacent BLM, Forest Service, state, county and private lands.

Within the plan boundary human developments (homes), road construction (West Butte Highway), resorts and agriculture have both positive and negative effects on wildlife habitats and influence the diversity of wildlife that occupy the area. BLM's ability in some areas to achieve guidelines is not always possible because of land ownership patterns and the interests of local governments and private property owners. The human population continues to grow and Central Oregon is a destination for many people seeking permanent and seasonal occupancy. Many of these people and locals use BLM lands for a variety of reasons that can affect wildlife.

Assumptions

Basic assumptions to support analysis for deer and elk (and occasionally sage grouse):

- Data for the B/LP RMP was collected and arranged differently than the current Draft Upper Deschutes RMP, making good comparison with the action alternatives difficult.
- In Alternative 1, the areas where the B/LP RMP specifically directed management considerations for wildlife are considered to be equivalent to primary emphasis; and areas where decisions were made for a non-wildlife program, but result in considerable benefits for wildlife, would also be considered primary or secondary wildlife emphasis areas.
- Managing sage grouse, deer and elk habitats for ≥70 percent habitat effectiveness (HE) would identify these species having a primary management emphasis and would result in retaining high use by these species.
- Managing sage grouse, deer and elk habitats for ≥50 percent HE would identify these species as one of several resources priorities and would result in retaining at least a moderate amount of use by these species.
- Managing sage grouse, deer and elk habitats for ≤50 percent HE would identify these species as a minor resource management consideration and recognize their areas as making only minor contributions to sage grouse, deer and elk management goals (concepts adapted from Christen, *et al.*, 1993).
- The effects of the proposed plan decisions for deer and elk are only assessed during winter (on winter habitats) and migration (on connectivity habitats) when human disturbances have the potential to be most detrimental.
- During alternative development it was decided to use an elk habitat effectiveness model (i.e. Thomas *et al.*, 1988) as a surrogate model for managing sage grouse habitats in the North Millican geographic area. While this area also contains deer and elk winter ranges it was assumed that if the area was managed for sage grouse, using an elk HE model (related to motorized travel), deer and elk would also benefit. The main assumption, and reason for using an elk HE model, was that by managing with a primary emphasis (70 percent HE) habitat fragmentation (caused by roads) would be low and would effectively minimize disturbance and collision effects, caused by motorized travel, to sage grouse. This approach would be used in concert with the existing Greater Sage Grouse and Sagebrush-Steppe Ecosystems Management Guidelines (2000) and would be an interim management strategy until new guidance is provided through either the Oregon State Office or Washington D.C. Office.
- Under the alternatives that adopt the "historic" vegetation management theme (3, 6 and 7), in the North Millican geographic area, near complete juniper removal would be a typical wildlife management goal (with the exception of old growth junipers), except for in Alternative 7, where some junipers would be retained to assist in OHV trail design and maintenance. However, the amount and distribution of junipers retained would not degrade the quality of sage grouse habitat.
- Standard design features described in Chapter 2 will be applied as described. These features contain many of the provisions that avoid, minimize, reduce, or eliminate potential wildlife effects.
- Habitat types can easily be identified and mapped into treatment units, treatment prescriptions can be written accurately so work can be done correctly, and funding will be available to accomplish the work.
- The proposed action will be beneficial to the natural environment and the target specie(s).
- Other resource management activities can be effectively coordinated to ensure the vegetative treatments will be successful.
- Desirable native plants and/or seeds will be available for vegetation treatments.

Indicators, benchmarks or other descriptions used to disclose and compare effects:
- Habitat effectiveness (≥70 percent, ≥50 percent and ≤50 percent) for disturbance related activities associated with motorized travel effects on deer, elk and sage grouse.
- Motorized road and trail densities (≤1.5 mi/mi2, ≤2.5 mi/mi2, ≥2.5 mi/mi2)
- Habitat patch sizes (large = 1,000 – 2,000 ac; moderate = 400 – 999 ac; and small = 40 – 400 ac).
- Seasonal closure periods (full versus partial versus none).
- Distance buffers around sensitive wildlife sites.
- Levels of human influence (low, moderate and high) for motorized travel-related activities.

Use of other analysis and/or models
- New information contained in the Interior Columbia Basin Ecosystem Management Project (ICBEMP) documents will be used as reference material. This scientific assessment and related documents provide a better understanding of the scope and possible broad-scale causes of current resource conditions. The scientific findings formed the basis for an array of management strategies evaluated by the Project and provided guidance for incorporating the science data and resource information developed by the Project into land and resource management plans and project implementation.
- The main issue deer and elk face in the project area is negative impacts caused by motorized travel during the winter. Also, potential vegetation treatments could complicate the suitability of the habitat in relation to open roads. The Habitat Effectiveness Index for Elk on Blue Mountain Winter Ranges developed by Thomas *et al.* (1988) would be used with modifications developed using findings in Rowland *et al.* (2000) to assess impacts caused by motorized travel. This model was selected because it addresses the most important habitat variables operating on elk winter ranges and their interactions. For the draft EIS, only the roads effects will be modeled.
- For assessing the effects of motorized travel related activities on other species of focus and source habitats we use a model developed by Gaines *et al.* (2002, in process).

Geographic or cultural boundaries used for cumulative effects analysis
- Wildlife Management Units as identified by Oregon Department of Fish and Wildlife.
- The amount of area extending outside of the planning area will be determined by looking at the extent of the winter range, watershed and sub-watershed boundaries and significant human created barriers.

Analysis of the Alternatives

Common to All

This analysis will assess effects from motorized recreation; cave management; travel management; fuels management in the wildland urban interface; management of special range and forest products; forestry; land ownership; minerals management and vegetation management. This analysis will not assess effects from management direction included in public health and safety and the archeological program because they would have insignificant effects on wildlife resources.

This plan also does not include alternatives to address effects of livestock grazing on wildlife because existing management (Standards for Rangeland Health and Guidelines for Livestock Grazing Management, BLM; 1997) adequately covers this issue. This plan does not propose changes in livestock grazing intensity or season of use (which can affect wildlife resources); therefore, grazing effects on wildlife are not addressed in this plan. Effects to wildlife from livestock grazing would be analyzed in detail during Rangeland Health Assessments and during site-specific analysis if changes in intensity and season of use are proposed.

Direct, indirect and cumulative effects

Management actions could have similar effects on many different species; therefore, this section discusses the general effects first and then follows with a discussion on certain species of focus and then on source habitats. The assessment of source habitats allows us to display effects on groups of species where effects would be similar, rather than repeating similar information for a large number of individual species.

Common effects of some resource management programs:

Bureau of Land Management resource management programs such as recreation, minerals, lands and forestry often effect the environment in similar ways, such as by removing habitats for site developments and road and trail construction and by causing disturbances in relation to motorized travel access. Motorized access (road and trails), regardless of project type, can have similar effects on wildlife and their habitats. The following table (Gaines *et al.*, 2002) provides a classification scheme used to describe the effects of road and trail use (especially from recreation) on wildlife resources. These would be indirect effects of decisions that will be made through this RMP and will not be repeated under each species or source habitat assessment.

Table 4-2. Comparison of classification schemes used to describe the effects of recreation on wildlife and the road- and trail associated factors used in this assessment

Road and trail – associated factors [a]	Disturbance type[b]	Reaction activity[c]	Definition of associated factors
Hunting and trapping	Disturbance type 3	Harvest	Mortality from hunting or trapping as facilitated by road and trail access
Poaching	Disturbance type 3	Harvest	Increased illegal take of animals as facilitated by trails and roads
Collisions	Disturbance type 3	Harvest	Death or injury resulting from a motorized vehicle running over or hitting an animal
Negative human interactions	Disturbance type 3	Harvest	Increased mortality of animals (euthanasia or shooting) owing to increased contact with humans, as facilitated by road and trail access
Movement or barrier or filter	Disturbance type 2	Habitat modification Disturbance	Interference with dispersal or other movements as posed by a road or trail itself or by human activities on or near a road or trail or road or trail network
Displacement or avoidance	Disturbance type 1	Disturbance	Spatial shifts in populations or individual animals away from a road or trail or road or trail network in relation to human activities on or near a road or trail or road or trail network
Habitat loss and fragmentation	Disturbance type 2	Habitat modification	Loss and resulting fragmentation of habitat owning to the establishment of road or trails, road or trail networks, and associated human activities
Edge effects	Disturbance type 2	Habitat modification	Changes to habitat microclimates associated with the edge induced by roads and trails
Snag or downed log reduction	Disturbance type 2	Habitat modification	Reduction in density of large snags and downed logs due to their removal near roads as facilitated by road access
Collection	Disturbance type 2	Harvest	Collection of live animals for human use as pets (such as amphibians and reptiles) as facilitated by the physical characteristics of roads or trails or by road or trail access
Route for competitors and predators	Disturbance type 2	Habitat modification	A physical, human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise
Disturbance at a specific site	Disturbance type 1	Disturbance	Displacement of individual animals from a specific location that is being used for reproduction and young rearing
Snow compaction	Disturbance type 3	Habitat modification	Direct mortality associated with animals being crushed or suffocated as a result of snow compaction from snowmobile routes or groomed ski trails
Physiological response	Disturbance type 1	Disturbance	Increase in heart rate or stress hormones when near a road or trail or network of roads or trails

[a]Based in part on Wisdom *et al.*, 1999.
[b]Disturbance type 1 occurs when an animal sees, hears, smells or otherwise perceives the presence of a human but no contact is made and it may or may not alter its behavior. Disturbance type 2 is when habitat is changed in some way. Disturbance type 3 involves human actions in which there is direct and damaging contact with the animal (Liddle, 1997).
[c]Knight and Cole, 1995.

Resource allocations and management activities that could affect sage grouse habitat and populations include:

- the "current" distribution vegetation emphasis, could continue the conversion of shrub-steppe plant communities to juniper woodlands resulting in the continuing trend of decreasing amounts of suitable habitat;
- under the "historic" theme, restoration treatments could increase the amount and distribution of suitable shrub-steppe habitat;
- Within WUI treatment areas, treatments could remove important sagebrush cover, but also remove unwanted young junipers;
- Recreation development and OHV management could reduce nesting, brood-rearing and winter habitats by construction of new and realignment is existing trails systems.

Special Habitats, Components and Features

Examples of special habitats include riparian areas and meadows; components include snags and downed logs; and features include caves, cliffs, and rock outcrops. Any management activity that directly alters these habitats or the ecotone (habitat edge) adjacent to them has the potential for diminishing their suitability as wildlife habitat. Ground-disturbing activities such as recreational development, off-road vehicle use, mining, or timber harvest could destroy vegetation in meadows and riparian areas. Recreational use and other disturbance could reduce the habitat value for caves, meadows and cliffs. Actions that alter ground water drainage patterns could alter or eliminate springs and seeps. Quarry development could directly affect talus areas, cliffs and caves. Road construction could adversely affect any special habitats either through directly altering habitat conditions or increasing the potential for disturbance through additional human use. Removal of vegetation surrounding meadows, seeps, and talus areas could alter air flow and solar radiation resulting in adverse changes in temperature, humidity, and other micro-site conditions. However, maintaining trees, or other vegetation, that are encroaching upon and degrading the natural function of a special habitat, component or feature (i.e., meadow, seeps and riparian habitats) could promote the conversion of one desirable habitat type into an undesirable type.

Transportation and Access

Bureau of Land Management activities, such as travel management, mineral developments, fuel treatments and logging can have considerable effects on wildlife habitats by short-term alteration of vegetation in WUI treatment zones and logging units and long-term elimination of vegetation in road and utility rights-of-ways. All of these activities typically use roads for access. Other effects, such as the disturbances on wildlife, could be caused by increased human access. Deer, elk, pronghorn, sage grouse and raptors are especially vulnerable to road effects. Road construction associated with regional travel management considerations can have greater impacts than local travel routes because of the roads' larger size and higher amounts of traffic. Additional roads would be built by private land owners for realty developments and other purposes. Blocking roads with gates and barricades, and designating roads as closed to public motor vehicle traffic would lessen the road effects on sage grouse, deer, elk and other wildlife by reducing harassment, disturbance and poaching. There could be an increase in the amount and distribution of noxious weeds, which in turn reduces the quality of wildlife habitats.

Timber Management

Timber management affects wildlife primarily by modifying their habitat. Timber management practices could reduce the amount of cover, which is important during breeding seasons, hot summers or periods of inclement weather and hunting seasons. Timber management also could have short-term affects of increasing forbs, grasses and shrubs that respond to disturbed soils and reduced canopy cover. Snags and downed

logs, important to wildlife, are often impacted during logging operations and vulnerable to firewood cutters after the harvest because of either new road access or increased visibility due to reduced vegetative cover.

Minerals

The effects of mining on wildlife resources are directed at mineral sales because this is where meaningful effects could occur to wildlife resources. This analysis will not analyze the effects of locatable or leasable minerals because the potential for these resources to exist in the planning area and be extracted is so low that the effects would be insignificant.

Mineral exploration and development could affect wildlife by removing habitats permanently or temporarily and by disturbance, but the degree of effect would depend on the type, intensity, duration and season of activity.

The direct effects of the alternatives would be the allocation of differing amounts of acres open for mining with no additional restrictions beyond the standard project design features (currently in place); the allocation of acres open to mining but with additional restrictions (i.e. wildlife seasonal closures); and the allocation of acres closed to mining.

The indirect effects would occur after a site-specific environmental assessment is completed and the long-term effects could include the physical loss of habitat when the vegetation is removed for access roads to the mineral site and for the site of mineral extraction. Another indirect but short-term effect could be the degradation of habitat adjacent to roads due to human related disturbances that would occur on access roads and mineral extraction sites. Habitat degradation, in this situation, is the decreased use of adjacent habitat, by wildlife, because of human activities (i.e. driving roads, extracting minerals, etc.). Refer to the above Table 4-3 for a list and description of effects related to roads and developed sites. Often mineral sites become locations for other human activities, such as target shooting and OHV recreation, which, if they occur, would cause a long-term disturbance effect. Cumulative effects would include the continued use of twenty existing mineral extraction sites on BLM-administered lands.

Table 4-3. Undeveloped sites containing suitable mineral resources, approximate size (acreage) of the potential mineral resource, and associated wildlife habitat

Site Name	Geographic Area	Wildlife Habitat(s)	Alternative where it is open
"E"	Millican Plateau	Deer winter range, Pronghorn winter range and year-round habitat.	CTA
"H"	Cline Buttes	Elk winter range	One
"J"	Cline Buttes	Elk winter range	One
"L"	Cline Buttes	Deer and Elk winter range	CTA[1]
"N"	Cline Buttes	Deer and Elk winter range	CTA[1]
O'Neil Prospect	Bend-Redmond	Old-growth Juniper Woodlands	CTA
Sage Hollow Prospect	North Millican	Sage grouse and pronghorn year-round, deer and elk winter range	CTA[1]

[1] Would have resource restrictions

The large number of acres open to mining does not provide a direct relation to the amount of potential effects of the alternatives because only a small fraction of these lands would actually be permitted for mineral extraction.

Military

The direct effects of military uses on wildlife resources focus on the allocation of lands to several different types of activities the Military conducts because these different activities can cause different effects on wildlife resources. Military uses could affect wildlife, but the degree of effect would depend on the type, intensity, duration and season of activity. Military activities could result in habitat loss or alteration due to physical changes in the plant community and negative effects associated with human disturbance. There are mainly three different types of activities the Military is involved in that provide a comparison of the differing degrees of negative impacts and they include:

- exercises with track and tread vehicles and people off road;
- exercises with tread vehicles and people off road; and
- exercises with only people off road and vehicles on roads.

A fourth variable that also provides a way to compare the potential impacts is the amount of rest (measured in years) an area would get between military uses. This is important because the longer time between exercises allows the plant community to recover and seeded plants to grow and establish a healthy root system. This is particularly important for late seral shrubs. In general, the impacts would be greatest in areas where track and tread vehicles and people are allowed off road because the heavier equipment (track vehicles) would cause greater damage to the habitat than tread vehicles and people on foot. Tread vehicles off road would cause the next highest level of impacts, while foot traffic only would be the least impacting.

The indirect effects would occur when the Military conducts their activities. Short-term impacts to the habitat could be the removal of live plants and reduced vigor caused by the crushing of forbs, grasses and shrubs. These areas are seeded after their activities with native seed to minimize the short-term and mitigate long-term impacts. With continued use the long-term effects could be a gradual change in the under-story plant community such as moving away from a late seral under-story plant community of perennial bunchgrasses (i.e., bluebunch, wheatgrass and needle grass) and shrubs (i.e., sagebrush and bitterbrush) toward an early seral stage under-story plant community (i.e., squirreltail, cheatgrass and rabbit brush). Typically, military activities would not impact old growth juniper trees or snags.

Land Ownership

Under all alternatives, efforts would be made to negotiate land exchanges, acquisition and disposals to permit better and more efficient management of BLM-administered lands. Most often, exchanges and acquisitions would benefit important wildlife resources and disposal would have minor impacts. However, benefits may not always occur in the same geographic area. For example, an exchange could occur where an isolated parcel of BLM that contains elk winter range located in La Pine is traded for Lands adjacent to BLM in John Day that may or may not contain elk winter range, but contain some other high value wildlife resource such as riparian habitats. The effect of land exchanges, acquisition and disposal on wildlife resources would be assessed in site-specific environmental assessments.

Fuels Management

Fuel treatments generally affect wildlife in three ways. Prescribed burning and mechanical cutting of vegetation and woody debris removes vegetation and woody structure and changes plant species structure and composition. This can result in the reduction of cover and forage habitat for some wildlife and increase the amount and vigor of herbaceous plants desired by other wildlife species. Fuels treatments can also be used to maintain or create desirable wildlife habitat conditions and reduce the risk

of catastrophic wildfires. Fire suppression has resulted in seral changes in vegetative communities that create different habitat conditions. In some areas, fuels treatments could bring the conditions closer to resembling their "historic" condition and decrease the risk of catastrophic fires (i.e. ponderosa pine habitats). However, in other habitats (such as lodgepole pine), wildfires often create ideal conditions for some species (i.e. black-backed woodpeckers) and altering this condition would move away from the potential "historic" condition.

Vegetation Management
Vegetation treatments typically affect wildlife by changing the suitability of the habitat for different species. Changes in plant species composition, structure and abundance can help maintain, improve, degrade or make habitats unsuitable for different wildlife species. Also, treatments can change how one specific wildlife species uses the habitat.

In juniper woodlands, savannahs and shrub-steppe habitats, managing habitats under the "historic" theme could increase the health and abundance of shrubs, grasses and forbs and increase their distribution (amount of area occupied, in acres), and would decrease the amount and distribution of young juniper. This theme would promote the restoration of shrub-steppe and savannah habitats.

Managing habitats under the "current" theme could increase the health and abundance of shrubs, grasses and forbs, but not as much as the "historic" theme, and would not significantly increase their distribution. This theme would provide for a mixture of forage and hiding cover and would promote the conversion of shrub-steppe habitats to juniper woodlands. Also, generally this theme could maintain hiding cover (juniper) when managing for deer and elk.

Recreation
Recreation developments could result in habitat loss or alteration, but the primary effects are associated with increased human disturbance to sensitive habitat areas, such as nest sites, winter ranges, and hibernacula caves. Open roads and trails for recreational and off-highway vehicle use would effect wildlife populations due to disturbance caused by increased access and vehicle/animal collisions resulting in death. Refer to Table 4-2 by Gaines *et al.* (2002) for a summary of the road and recreation trail associated effects on habitat or populations of wildlife species. Some wildlife species are attracted to the presence of humans. For example, habitats fragmented by roads typically support higher densities of brown-headed cowbirds, and ravens and crows often forage along roads, feeding on animals injured or killed by vehicles. These animals can also affect other wildlife.

Effects to Wildlife based on Analysis of Wildlife Emphasis Levels, Habitat Effectiveness Index and Habitat Influence Indexes

Introduction and General Discussion
The effects analysis for impacts to wildlife resources provides two main ways to compare the alternatives. First is the comparison in the amount of public lands that would be allocated to one of three different wildlife emphasis levels (primary, secondary or minor) and other related guidelines. See Chapter 2, Alternatives for definitions of these three emphasis levels.

Second is the comparison in the amounts of roads (arterials and collectors) and the impacts they have on wildlife. Two different approaches were used to assess the impacts roads have on wildlife. The first approach uses simple GIS models based on Gaines *et al.* (2000) to estimate the current level of influence of linear recreation routes on focal wildlife species habitats. For juniper woodland and ponderosa pine/lodgepole pine forest habitats within the planning area, the primary cavity excavator habitat influence index was used; for riparian habitats, the riparian habitat non-winter route density index was used; and for bald and golden eagles a modified Gaines approach was used. Indexes

for sage grouse, pronghorn and shrub-steppe source habitats were not included in the Gaines report. Therefore, we developed our own, using the same concepts and principles.

The second approach we use to assess the effects motorized travel have on wildlife is to calculate habitat effectiveness for deer and elk [for example, using the Habitat Effectiveness Index for Elk on Blue Mountain Winter Ranges developed by Thomas *et al.* (1988)]. However, for the draft EIS, only the roads effects will be modeled, and we developed the road effects model using findings in Rowland *et al.* (2000).

All of the models are described below:

- The Shrub-Steppe Habitat Assessment/Roads Influence Index is designed to address a number of potential effects (edge effects, disturbance, vehicle and animal collisions, habitat loss and fragmentation) resulting from road associated factors. This index is calculated by using GIS with a current open roads data layer and shrub-steppe habitat layer.
- The Woodland and Forest Habitat Assessment/Road Influence Index is designed to address a number of negative effects (disturbance, edge effects, snag and downed log reduction, habitat loss and fragmentation, etc.) resulting from road associated factors. This index is calculated by using GIS with a current open roads data layer and woodland/forest habitat layer.
- The Golden Eagle Nesting Habitat Disturbance Index was used to evaluate the potential influences of human activities on golden eagle nesting and adjacent foraging habitats. This indes is calculated by identifying all known, and potential habitat nesting habitat (typically, this is individual trees, snags and rock outcrops), and identify a one mile distance band around the feature. The area within the one mile distance band is condered nesting and adfjacent foraging habitat. This index is calculated by using GIS with a current open roads data layer and the nesting and adjacent foraging habitat layer.
- Using the Habitat Effectiveness index for sage grouse, deer and elk based on arterial and collector roads provides an understanding of the different levels of effects associated with the two road options. The arrangement and quantity of local roads are not specifically identified in any alternative for evaluation and therefore are not directly assessed using a road index model. However, local roads are included in the road influence indexes for source habitats to display the current conditions and provide a comparison to the management guidelines identified for each wildlife emphasis level in each alternative.
- The approach of the analysis and discussing potential effects on wildlife has several aspects that differ depending on the species or source habitat. Currently, existing data (vegetation condition) is not available to fully assess the HE, but sufficient data is available to assess the effects of different motorized travel route designations (arterial and collector roads). Local roads are not included in the HE analysis because their specific arrangement does not differ by alternative. However, a discussion of a comparison between the proposed wildlife emphasis levels is made with the HE.

Alternative 1

Emphasis Areas

The direct effect of this alternative to wildlife is the allocation of 160,627 acres (40 percent) of BLM-administered lands to be managed at a primary emphasis level.

This alternative falls in the middle of all alternatives in the amount of primary emphasis areas identified for wildlife, as well as when considering the amounts in secondary and minor emphasis areas. This alternative provides a fairly good distribution of habitat that would be managed with a primary emphasis across the planning area, but a large portion is concentrated in the southern part of the planning area. The main reason this alternative does not have lower amounts of primary emphasis areas is because of the

"other resources" management programs that result in favorable situations for deer and elk. The Badlands and Steelhead Falls WSAs are good examples of areas that provide management conditions similar to primary emphasis.

Fourteen percent of the plan area would be managed with a secondary emphasis by considering deer wintering needs in the Millican Plateau geographic area. Forty-six percent would be managed with minor consideration for wildlife. Most of these areas occur in large blocks of BLM-administered lands in Bend-Redmond, Cline Buttes, Mayfield and Millican Plateau geographic areas.

Bald Eagles

There is a low amount of bald eagle habitat located on BLM-administered lands in the planning area. However, there are large ponderosa pine trees that can be used for bald eagle nesting, roosting and perching located on BLM-administered lands. The Bureau of Reclamation (BOR) is currently developing a recreation management plan to increase recreational opportunity in the Prineville Reservoir area located on BOR administered lands. This area has at least one pair of bald eagles nesting on BLM, but foraging mainly along the reservoir and the BOR administered lands. Activities proposed to occur on BOR lands in the Prineville Reservoir area are likely to limit eagle use.

Cumulative effects of combined activities on BLM-administered lands and actions on other lands in the planning area would likely maintain current low levels of bald eagle habitat and populations. Based on current Oregon Forest Practices Act riparian regulations, bald eagle habitat and populations are not expected to increase from already low levels on private lands in either the short or long term. Since continued protections around known eagle nest sites and riparian areas would be available under Alternative 1 (assuming no change in bald eagle habitat on private lands), the cumulative effects would result in the maintenance of the amounts of bald eagle habitat and populations within the planning area. From a regional perspective, similar levels of habitat protection on other federal lands (for example, national forests and other BLM districts) would tend to result in modest increases in bald eagle habitat and populations over time.

Golden Eagle

Emphasis Areas

All habitats within ½ mile of eagle nests and roost sites/trees are considered primary wildlife emphasis areas. The direct effect of Alternative 1 would be the management of 41 percent (16,203 ac.) for golden eagle nesting and adjacent foraging habitat with a primary emphasis for eagles. This is a result of managing for disturbance within only ½ mile of nest sites. The indirect effect may be the degradation of some adjacent foraging habitat either from human disturbance and/or from lack of habitat restoration efforts. This alternative provides the least amount of management emphasis for golden eagles.

Sage Grouse

Emphasis Areas

Sage grouse are a BLM designated Sensitive Species and the B/LP RMP stated that seasonal restrictions would be applied to important seasonal wildlife habitats, such as sage grouse, and expected that a habitat management plan would be developed (page 97). This information, coupled with the BLM's Special Status Species Policy, directs sage grouse breeding (lekking and nesting) and wintering habitats to be managed with a primary emphasis in the new plan. Most of the sage grouse habitat within the plan boundary is either nesting or wintering habitats, which are important seasonal wildlife habitats. Therefore, in Alternative 1, all sage grouse habitats are considered a primary wildlife emphasis area.

Alternative 1 provides primary emphasis for all sage grouse habitat in the planning area directing the BLM to protect and promote habitat suitability. This alternative would provide the best distribution of habitat possible. However, habitat restoration would be required to positively influence sage grouse habitat conditions and population numbers.

Habitat Effectiveness (HE)

The overall HE for sage grouse habitats in the planning area for Alternative 1 would be 48 percent in relation to arterial and collector routes. However, this doesn't consider seasonal closures for motorized travel in the North and South Millican geographic areas. The seasonal motorized travel restrictions vary by geographic area. In North Millican the seasonal closure would protect wintering and breeding birds (birds attending leks), but nesting and brood-rearing would not be protected. In South Millican the seasonal closure covers the winter, breeding, nesting and most of the brood-rearing periods. Also, motorized travel is limited to designated roads in the Horse Ridge geographic area, which also limits the effects from motorized vehicles. With these types of travel restrictions in place and the guidelines CTA, sage grouse habitats should be well managed in relation to human disturbance effects.

Townsend's Big-eared Bat

The Townsend's big-eared bat's (BLM designated Sensitive Species) primary habitat features are caves used for roosting, as maternity colony sites and as hibernacula. Resource allocations and management activities that could have negative effects by causing disturbance near sites include: off-highway vehicle management, recreation development, and mineral exploration and development. Riparian buffers and special habitat feature distance buffers could have positive effects by protecting the sites from disturbance. There are several cave and cave-like features (i.e. lava tubes, mine shafts, etc.) in the planning area and only a few have been surveyed and known to contain suitable habitat. Year-round closures provide the optimum protection for Townsend's bats because they use these cave features year-round for a variety of life history needs, and are known to be sensitive to human disturbances (Rauscher, 2000).

Redmond Caves: Alternative 1 provides no direct management emphasis for bats. However, under the Special Status Species Policy, general guidance is provided to consider and protect important habitats of BLM designated sensitive species.

Deer

An important difference between the approaches taken in the B/LP RMP versus the UDRMP is that the management strategy of using crucial winter range has been dropped in the UDRMP and all winter range is recognized (but not always managed with an emphasis). This change in approach is proposed because of the concern that unpredictable weather patterns sometimes make areas of crucial winter range unavailable during some years. In order to resolve this concern, the UD RMP takes the approach to recognize all winter range and manage for more areas with a better distribution than B/LP RMP.

Emphasis Areas

The B/LP RMP identified crucial winter range for deer and stated that seasonal restrictions would be applied to this habitat (page 97). Additional direction is given to mitigate impacts in crucial wildlife habitats, such as the mule deer migration corridors in La Pine. Also, BLM signed a Memorandum of Understanding with ODFW in 1990 to protect the deer migration corridors. Therefore, in Alternative 1, all habitats mapped as crucial winter range (45,783 ac.) and mule deer migration corridors (33,588 ac.) are considered primary emphasis areas for deer.

Other management decisions, either as a direct RMP allocation or through subsequent NEPA decisions, have occurred under the B/LP RMP that provide protection to additional areas currently recognized as winter range[1] that were not identified as "crucial" in B/LP RMP. These areas include all of Badlands, Horse Ridge and Smith Rock geographic areas and parts of Prineville Reservoir (Eagle Rock area), Steamboat Rock (Wild and Scenic River and WSA), and Tumalo (northern block) geographic areas. These areas together include approximately 112,953 acres of winter ranges. Some of these areas overlap with the existing crucial deer winter ranges. In all, the direct effect of this alternative would be the management of approximately 158,736 acres (60 percent), of BLM-administered lands, with a primary emphasis for deer winter range. This alternative provides the third highest amount of BLM lands with a primary emphasis; however, it would manage a low amount in the secondary level, which would lower this alternative's position to the middle, overall, as compared to the other alternatives.

An indirect effect on deer winter range, across the planning area, would be a moderately high distribution of habitat that would have an emphasis for deer.

Another direct effect would be the management of 35,800 acres in the Millican Plateau that would be closed during high-snow depths to accommodate deer wintering needs during extreme high snowfalls. This is considered a secondary emphasis level management strategy.

The deer migration corridor encompasses nearly all BLM-administered lands (41,191 ac.) in La Pine. However, only the high-use areas were recognized and identified as a management emphasis for deer under the B/LP RMP. These high use areas make up 82 percent (33,588 ac.) of all BLM lands in La Pine and are considered to be managed as a primary emphasis. The direct effect of this alternative on deer migration would be the management of 33,588 acres of BLM-administered lands to be managed as a primary emphasis for deer migration needs.

Additionally, in La Pine, Alternative 1 would manage 83 percent (33,657 ac.) of the deer migration corridor with a primary emphasis and 17 percent (6,986 ac.) with a minor emphasis for deer (see Table 2-9, Alternative 1 Summary for Connectivity Corridors). This allocation of lands would result in a moderately high distribution of habitat across the migration corridor that would be managed with a primary emphasis for deer. These primary emphasis areas would be located in the major mule deer migration areas as identified in the B/LP RMP. However, nearly all of the lands located in the La Pine geographic area are used by deer during migration.

Transportation

Overall, Alternative 1 would manage arterial and collector roads so their effect on deer winter range would result in a habitat effectiveness of 56 percent across the planning area on BLM-administered lands (see Table 4-4: Roads and Wildlife Habitat Effectiveness Index Summary for a complete listing of the habitat effectiveness for each alternative and geographic area). Of the 14 geographic areas that contain deer winter range, three (Badlands, Smith Rock and Steamboat Rock) would retain over 70 percent HE and maintain a high amount of management ability to manage local roads and achieve a primary emphasis level for deer. The B/LP RMP identified only a small amount of crucial winter ranges in the Badlands; however, all three geographic areas contain winter range. As mentioned earlier, under the wildlife emphasis section, these three areas have direction that would manage them with a primary emphasis for deer winter range values.

Four geographic areas (Cline Buttes, Northwest, Prineville and Prineville Reservoir) would manage arterial and collector roads with an HE between 50 percent and 70

[1] "currently recognized as winter range" refers to the BLM mapped deer winter range used for the analysis of the Upper Deschutes RMP/EIS.

percent, maintaining some ability to manage local roads at a secondary emphasis level. However, two of these areas (Prineville and Prineville Reservoir) have a recreation travel access designation of open year-round to cross-country motorized travel and Cline Buttes is limited to existing roads and trails year-round. The B/LP RMP identified some crucial winter ranges in the Prineville and Prineville Reservoir geographic areas, but not in the Cline Buttes area. An existing seasonal closure in the Sanford Creek and travel restrictions in the Wild and Scenic River Corridor already provides some of these winter ranges with an emphasis for deer. As mentioned under the wildlife emphasis section, the Prineville and Prineville Reservoir geographic areas would emphasize some deer winter range areas while Cline Buttes and Northwest would not.

The remaining geographic areas would manage arterial and collector roads below 50 percent HE resulting in a difficult situation to manage for a minimum of a secondary emphasis. Potentially, many local roads and some arterial and collector roads would need to be permanently or seasonally closed to manage for deer winter range. As previously mentioned in the wildlife emphasis section, four of these areas (Horse Ridge, North Millican, South Millican and Tumalo) currently have travel restrictions that result in a primary emphasis for deer while the Millican Plateau would be managed for a secondary management emphasis. The Mayfield geographic area would not emphasize deer winter range; however, this area contains the least amount of winter range of all geographic areas.

Cumulative Effects

Alternative 1 would manage 178,462 acres (60 percent as primary emphasis and 8 percent as secondary emphasis) within the planning area for deer winter range. In general, most winter ranges recognized by ODFW would have BLM-administered lands managed as a primary emphasis for deer. The exception is the Metolius Deer Winter Range where BLM would manage 6,745 acres with a minor emphasis.

BLM manages an additional 16,000 acres outside, but adjacent to the planning area with an emphasis on deer winter range.

The Forest Service manages deer winter range, with an emphasis for high use, on lands immediately adjacent to the plan area. Deer herds use both ownerships together and sometimes move back and forth depending on weather conditions. As a general example, the Forest Service manages approximately 209,822 acres of deer winter range immediately adjacent to the plan area. The average HE of this habitat, in relation to arterial and collector roads, is 48 percent. A more specific example is where the Deschutes National Forest is currently proposing management activities on over 48,600 acres of deer winter range in the Pine Mountain area. "Providing high quality winter forage in adequate quantity and distribution to meet nutritional demands of wintering mule deer" was a primary wildlife objective during the planning of the Opine project (Lowrie, Wildlife Report, 2003). The East Fort Rock OHV Trail System is also located adjacent to the BLM planning area boundary and occupies some of the same area as the Opine project. This OHV trail system is open year-round and when coupled with roads has a high motorized travel route density which is not favorable to deer habitat management.

Private lands also play a role in managing for healthy deer herds. Fencing, urban development and some agricultural practices are a few examples of actions on private lands that can have negative effects on deer and their habitats. Water development, certain agricultural practices and limiting human access to private lands are a few examples of actions on private lands that help contribute effective habitat for deer. The creation of the new West Butte/Millican "Highway" will increase motorized travel along this travel route and increase the amount of human visitation that the BLM lands (and deer habitat) will receive in the near future.

There are approximately 133,253 acres of private lands that have an average HE rating of 53 percent (based on arterial and collector roads). This acreage figure only includes agricultural lands. Property listed by the Counties as "urban" were removed from consideration as contributing to winter habitat.

Cumulative effects of combined activities of Alternative 1 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in maintaining healthy habitat conditions and populations of deer. This expected maintenance is due to the moderate amount of management restrictions placed on motorized travel, the large amount of federal ownership and the moderately favorable management practices on adjacent Forest Service lands.

Elk

Emphasis Areas
There are no areas identified as a primary emphasis for elk in the B/LP RMP. However, other resource management programs indirectly benefit elk in this alternative. The Badlands, Horse Ridge, North Millican, Prineville Reservoir, Steamboat Rock, and Tumalo have areas with elk winter range and management practices equal to that of a primary emphasis. This results in 86,568 acres of elk winter range that are fairly well distributed across the planning area, with the exception of the Northwest geographic area. In comparison to the other alternatives, Alternative 1 is fifth in acres providing an emphasis (primary or secondary) for elk.

Additionally, Alternative 1 would manage no areas of elk connectivity habitat with a primary emphasis, 86 percent (7,068 ac.) with a secondary emphasis and 14 percent (1,123 ac.) with a minor emphasis for elk (refer to Alternative 1 Summary Table 2-9 for Connectivity Corridors). This allocation of lands would result in a high amount and distribution of habitat within the migration corridor (located in the Prineville Reservoir geographic area) that would be managed with an emphasis (primary and secondary) for elk. A considerable amount of the management afforded elk is in relation to the Sanford Creek and Eagle Rock seasonal road closure areas.

Transportation
Alternative 1 would manage arterial and collector roads so their effects on elk winter range would result in an average habitat effectiveness of 57 percent across the planning area on BLM-administered lands. Refer to Table 4-4 for a complete listing of the habitat effectiveness for each geographic area. Of the 13 geographic areas that contain elk winter range, two (Badlands and Steamboat Rock) would retain over 70 percent HE and maintain a high amount of management ability to manage local roads and achieve a primary emphasis level for elk.

Four geographic areas (Cline Buttes, Millican Plateau, Northwest and Prineville Reservoir) would manage arterial and collector roads to where they would result in over 50 percent HE (but less than 70 percent). Cline Buttes and the Northwest geographic areas, however, are open year-round to motorized travel and Cline Buttes is a popular area for OHV use. Currently there are some seasonal closures in the Prineville (Eagle Rock area) and Prineville Reservoir (Sanford Creek area) geographic areas that provide high HE during the winter.

The remaining 7 geographic areas would manage arterial and collector roads to where they would result in less than 50 percent HE. However, management decisions under B/LP RMP has some year-round road closures in Horse Ridge, and seasonal road and trail closures in North and South Millican , which likely results in a primary emphasis. Of the remaining three geographic areas, La Pine contains a considerable amount of winter range (17 percent), and Alternative 1 would manage arterial and collector roads to an HE of 34 percent.

Cumulative Effects/Conclusion

Alternative 1 would manage 86,568 acres (48 percent as primary emphasis) of elk winter range within the planning area to benefit and retain high use by elk. In general, most geographic areas with winter ranges would have limited amounts of BLM-administered lands managed as a primary emphasis for elk. The exceptions include the Badlands, Horse Ridge North Millican, South Millican and Tumalo geographic areas, where BLM would manage 73,964 acres at a level equivalent to a primary emphasis.

BLM manages an additional 8,033 acres outside but adjacent to the planning area with an HE score of 53 percent (based on arterial and collector roads only). These areas are not identified for benefiting elk, but a small amount does fall into areas identified as deer crucial winter range and the management in these areas would benefit elk to some degree.

On lands immediately adjacent to the plan area the Forest Service manages elk winter ranges with varying emphasis for elk use. Because elk have been increasing their use more recently in areas that were not always recognized during earlier forest plan developments, the Forest Service may not have all current winter range identified or considered for elk use (i.e., area immediately south of Horse Ridge and South Millican geographic areas). However, many of these areas overlap with deer winter range and subsequently receive some management consideration that benefits elk. The Forest Service has identified "Key Elk Areas" where they manage with an emphasis for elk. Several of these areas are located immediately adjacent to BLM-administered lands in the planning area, such as in La Pine.

Elk herds use both BLM and Forest Service ownerships together and sometimes move back and forth depending on weather conditions. In general, the Forest Service manages approximately 175,374 acres of elk winter range immediately adjacent to the plan area. The average HE for this habitat, in relation to arterial and collector roads, is 47 percent.

Private lands also play a role in managing elk herds. Fencing, urban sprawl, splitting of large ranches into smaller "ranchettes" and some agricultural practices are a few examples of actions on private lands that can have negative effects on elk and their habitats. Water development, certain agricultural practices and limiting human access to private lands are a few examples of actions on private lands that help contribute to effective habitat for elk. The creation of the new West Butte/Millican "Highway" will increase motorized travel along this travel route and increase the amount of human visitation to BLM lands (and elk habitat) in the near future.

There are approximately 175,878 acres of private lands that have an average HE rating of 50 percent (based on arterial and collector roads). This acreage figure only includes agricultural lands. Property listed by the Counties as "urban" were removed from consideration as contributing to winter habitat.

Cumulative effects of combined activities on BLM-administered lands and actions on other lands in and immediately adjacent to the planning area are expected to result in a decline in elk habitat quality and in the numbers of elk in the Cline Buttes, La Pine, Mayfield, Prineville, Prineville Reservoir, North West and Steamboat Rock geographic areas. This expected decline would be due to anticipated high levels of roads, urban sprawl and a focus on other BLM resource management programs. However, elk habitat quality and numbers of elk are expected to remain stable in the Badlands, Horse Ridge, North Millican, South Millican and Tumalo geographic areas. This expected maintenance of elk habitat and elk numbers in these areas is due to management restrictions placed on motorized travel, the large amount of federal ownership and the favorable management practices on adjacent Forest Service lands.

Pronghorn

An important difference between the approaches taken in B/LP RMP versus UDRMP is that crucial winter range has been dropped in the UDRMP and year-round habitats and winter range habitats are recognized (but not always managed as an emphasis). This is done because in most of the planning area, pronghorn have not been showing a significant seasonal use pattern to any certain geographic area, but are moving around in their habitats. However, in the Crooked River and Combs Flat areas, pronghorn tend to concentrate during the winter in specific areas, so these areas are identified as winter range. The UD RMP takes the approach to recognize all year-round habitats and a couple winter range areas.

Emphasis Areas

Brothers/La Pine identified crucial winter range for pronghorn and stated that seasonal restrictions would be applied to this type of habitat (page 97). Other management decisions, either as a direct RMP allocation or through subsequent NEPA decisions, have occurred under B/LP RMP that provides management emphasis favorable to pronghorn and equivalent to a primary emphasis. Therefore, in Alternative 1, 65,195 acres (39 percent) of pronghorn habitats, including all habitats mapped as crucial winter range and areas with other management direction favorable to pronghorn are considered primary emphasis areas. The location of these emphasis areas (Badlands, Horse Ridge, North Millican and South Millican geographic areas) are concentrated, geographically, resulting in a poor distribution of habitats managed with an emphasis for pronghorn. For example, the Millican Plateau and Bend-Redmond geographic areas contain the two largest percentage of winter range (25 percent and 16 percent) and would be managed with a minor emphasis.

Additionally, Alternative 1 would manage 10 percent (2,287 ac.) of pronghorn connectivity corridors with a primary emphasis, 18 percent (4,050 ac.) with a secondary emphasis and 72 percent (16,285 ac.) with a minor emphasis for pronghorn (refer to Table 2-9, Alternative 1 Summary of Connectivity Corridors). This alternative would provide the second lowest amount of connectivity habitat, of all the alternatives, with a primary or secondary emphasis for pronghorn. Alternative 1 would provide a low distribution of habitat across all the connectivity corridors, which would be managed with a primary or secondary emphasis for pronghorn. The minor emphasis that would be placed on the pronghorn connectivity corridors in the Mayfield and Millican Plateau geographic areas could limit pronghorn movements through these areas in the future.

Transportation

Alternative 1 would manage arterial and collector roads so their effects on pronghorn year-round habitats would result in an average road influence of 31 percent across the planning area on BLM-administered lands and results in a moderate level of human influence. Even though local roads are not yet factored in, having a moderate RII (road influence index) score indicates that BLM has the ability to manage local roads to emphasize pronghorn habitats at a secondary emphasis. Refer to Table 4-4 for a complete listing of the habitat effectiveness for each geographic area. Of the nine geographic areas that contain pronghorn habitats, three (Badlands, Prineville and Prineville Reservoir) would retain less than 30 percent level of human influence on pronghorn habitats and maintain a high amount of management ability to manage local roads and achieve a primary emphasis level for pronghorn. However, these three geographic areas contain only 19 percent of the pronghorn habitat in the planning area that is located on BLM-administered lands

Cumulative Effects/Conclusion

Alternative 1 would manage 65,195 acres (39 percent as primary emphasis) of pronghorn habitats within the planning area to benefit and retain high use by pronghorn. In general most geographic areas with pronghorn habitats would have limited amounts of BLM-administered lands managed as a primary or secondary emphasis for pronghorn.

BLM manages an additional 42,750 acres outside, but adjacent to the planning area with a RII score of 15 percent (based on arterial and collector roads only). Some of this habitat (10,240 acres) is recognized as crucial pronghorn winter range and would be managed similarly to a primary emphasis.

On lands immediately adjacent to the planning area, the Forest Service manages 55,040 acres of pronghorn habitats with 39 percent (a moderate level) of influence from arterial and collector roads. These habitats are split between two areas; one area is located south of Horse Ridge and South Millican, and the other area is on the National Grasslands located north of Smith Rock.

On private lands within the planning area, there are 85,018 acres of pronghorn habitat and with 18 percent (a low level) of human influence from arterial and collector roads. On private lands outside but adjacent to the planning area there are 31,754 acres of pronghorn habitat with 16 percent (a low level) of human influence from arterial and collector roads. Pronghorn are being impacted on private lands similarly as described earlier for deer and elk; however, pronghorn are affected more by fencing than deer or elk.

Some private ranch lands within the planning area (Bend-Redmond and Prineville geographic areas) are being developed as destination resorts and likely will become unsuitable habitat for pronghorn. Additionally, these resorts create access routes and build additional fences that negatively impact pronghorn by removing and fragmenting habitats and providing for greater opportunities for animal and vehicle collisions.

Cumulative effects of the combined activities on BLM-administered lands and actions on other lands in and immediately adjacent to the planning area are expected to result in a decline in pronghorn habitat quality and in the numbers of pronghorn in the Bend-Redmond, Mayfield and Millican Plateau geographic areas. This expected decline would be due to anticipated high levels of motorized use associated with high densities of roads and trails. Also, this alternative provides no emphasis for habitat management in these areas. Pronghorn habitat quality and numbers of pronghorn are expected to remain stable in the Badlands, Horse Ridge, North Millican and South Millican geographic areas. This expected maintenance of pronghorn habitat quality and pronghorn numbers in these areas is due to management restrictions placed on motorized travel, especially during the winter in North Millican, winter through early summer in south Millican and the low motorized travel route densities in the Badlands and Horse Ridge geographic areas. Additionally, the recent past and current vegetation management efforts have contributed and likely will continue to contribute to suitable pronghorn habitat conditions in these areas.

Shrub-Steppe Source Habitat

Transportation
The analysis of transportation (motorized travel) effects on shrub-steppe source habitat (and associated wildlife species) includes all mapped roads (arterial, collector and local roads) and motorized OHV trails in the Millican Valley OHV trail system. In some geographic areas this calculation underestimates the effects of motorized travel because not all roads and trails are mapped and therefore are not included in the analysis. Also, some areas would be open to cross-country travel and some areas would be seasonally closed, and these areas have not been included.

Alternative 1 would manage arterial and collector roads so their effects on shrub-steppe source habitats would result in an average road influence of 36 percent across the planning area on BLM-administered lands and results in a moderate level of human influence. Local roads were also included in this analysis, so having a moderate RII score

indicates that BLM has a relatively high ability to manage local roads to have a low level of human influence[2] on shrub-steppe source habitats.

Of the 14 geographic areas that contain shrub-steppe source habitats, three (Badlands, Northwest and Steamboat Rock) would retain less than a 30 percent level of road influence on shrub-steppe source habitats and maintain a high ability to manage local roads with a low level of human influence on shrub-steppe source habitats. However, these three geographic areas contain only seven percent of the shrub-steppe source habitats in the planning area that is located on BLM-administered lands and most (63 percent) of this is located in the Badlands WSA.

Ten geographic areas (Cline Buttes, Horse Ridge, Mayfield, Millican Plateau, North Millican, Prineville, Prineville Reservoir, Smith Rock, South Millican and Tumalo) would manage arterial and collector roads with a road influence between 30 percent and 50 percent, which would maintain a relatively high ability to manage local roads at a moderate level of human influence, especially since local roads are included in this analysis. These ten areas would contain 90 percent of the shrub-steppe source habitats in the planning area that are located on BLM-administered lands.

The Bend-Redmond geographic area would be the only geographic area that would manage arterial and collector roads with a road influence greater than 50 percent resulting in a high level of human influence. This would create a limited ability to manage local roads with at least a moderate level of human influence. The Bend-Redmond geographic area contains only three percent of the shrub-steppe source habitats in the planning area that are located on BLM-administered lands.

Juniper Woodland Source Habitat

Transportation
The analysis of transportation (motorized travel) effects on juniper woodland source habitats (and associated wildlife species) includes all mapped roads (arterial, collector and local roads) and motorized OHV trails in the Millican Valley OHV trail system. In some geographic areas this calculation underestimates the effects of motorized travel because not all roads and trails are mapped and therefore not included in the analysis. Also, some areas would be open to cross-country travel and some areas would be seasonally closed and these areas have not been included.

Alternative 1 would manage arterial and collector roads so their effects on juniper woodlands source habitats would result in an average road influence of 21 percent across the planning area on BLM-administered lands and results in a low level of human influence. Local roads were also included in this analysis, so having a low RII score indicates that BLM has a high ability to manage local roads to have a low level of human influence[4] on juniper woodland source habitats.

Of the 14 geographic areas that contain shrub-steppe source habitats, nine (Badlands, Cline Buttes, Horse Ridge, Mayfield, Millican Plateau, North Millican, Prineville, Prineville Reservoir and Northwest) would retain less than a 30 percent level of road influence on juniper woodland source habitats and maintain a high ability to manage local roads with a low level of human influence on juniper woodland source habitats. These nine geographic areas contain only 78 percent of the juniper woodland source habitats in the planning area that are located on BLM-administered lands.

Five geographic areas (Bend-Redmond, Smith Rock, South Millican, Steamboat Rock and Tumalo) would manage arterial and collector roads with a road influence between 30

[2] The categories and associated terms used to describe level of human influence in relation to the road influence index are directly tied to the wildlife emphasis levels and are as follows: a low level of human influence equals a primary emphasis; a moderate level of human influence equals a secondary emphasis; and a high level of human influence equals a minor wildlife emphasis.

percent and 50 percent, which would maintain a relatively high ability to manage local roads at a moderate level of human influence, especially since local roads are included in this analysis. These five areas would contain 22 percent of the shrub-steppe source habitats in the planning area that are located on BLM-administered lands.

In Alternative 1, there are no geographic areas that would manage arterial and collector roads with a road influence greater than 50 percent, resulting in a high level of human influence.

Common to Alternatives 2-7

All action alternatives would provide the opportunity to decrease the amount of physical impacts to vegetative habitats by limiting most motorized travel to designated routes. All action alternatives would provide direction to improve habitat conditions (through vegetation treatments), which, in general, would result in increased habitat conditions for most species of focus. However, depending on the proposed actions of the different alternatives, such as travel management, some areas that would have improved habitat conditions (because of vegetation treatments) may not be available to certain wildlife species (because of human disturbances) resulting in an ultimate decline in habitat quality.

There are a few areas throughout all the action alternatives where wildlife would be a primary emphasis. The following geographic areas and their associated wildlife resources are the main areas where wildlife would be a primary emphasis:

- **Badlands -** Deer and elk winter ranges and pronghorn year-round and connectivity habitats.
- **Horse Ridge –**Deer and elk winter range, sage grouse nesting habitat and pronghorn year-round habitat in the northern area.
- **La Pine -** Deer migration and elk winter ranges in the northern area.
- **Northwest -** Deer and elk winter ranges.
- **Prineville Reservoir -** Deer and pronghorn winter ranges and raptor nest and foraging habitats near the Crooked River.
- **Smith Rock -** Deer winter range and raptor nesting and foraging habitats.
- **Steamboat Rock-** Elk winter range, raptor nesting and foraging habitats along the Deschutes and Crooked Rivers in the miscellaneous scattered parcels.
- **Tumalo -** Deer and elk winter ranges.

In recent wildlife management strategies (e.g., Partners-In-Flight, 2000), foraging habitats for raptors located adjacent to their nest sites has been identified as a conservation concern and recommended for increased management emphasis. Therefore, for eagles, in Alternatives 2-7, all habitats within 1 mile of eagle nests sites/trees are considered their adjacent foraging habitats and would be managed as directed by the geographic areas wildlife emphasis level. The goals for management would be consistent with the low, moderate and high influence levels identified in the disturbance index.

Bald Eagles

The assessment of effects on bald eagle habitat is based on the number of potential bald eagle breeding and winter roosting sites that would be maintained under each alternative. Bald eagle sites (including three nest sites and one potential roost site) would be protected under all alternatives. There are other potential habitat sites (that is, sites identified by field surveys) that would be retained and protected under Alternatives 2-7.

Resource allocations that could have negative effects on bald eagles include: acres available for timber harvest, road management, and dead and downed log and snag retention levels could reduce existing and potential habitat; and recreation development and off-highway vehicle management could increase potential for human disturbance to

nesting, roosting and foraging sites. Allocations that could have positive effects include: buffers on special habitat features and riparian zones could enhance perch and nest sites and provide more forage areas, and vegetation treatments that enhance the growth of ponderosa pines and make them less vulnerable to fire and disease effects.

Cumulative effects of combined activities on BLM-administered lands and actions on other lands in the planning area would likely maintain current low levels of bald eagle habitat and populations. Based on current Oregon Forest Practices Act riparian regulations, bald eagle habitat and populations are not expected to increase from already low levels on private lands in either the short or long term. Since additional potential future habitat and riparian protection would be available under Alternatives 2-7 (assuming no change in bald eagle habitat on private lands), the cumulative effects would result in slightly higher amounts of bald eagle habitat and populations within the planning area. From a regional perspective, similar levels of habitat protection on other federal lands (for example, national forests and other BLM districts) would tend to result in modest increases in bald eagle habitat and populations over time.

Resource allocations are expected to result in an increase in bald eagle habitat quality, but because of the low amount of habitat on BLM-administered lands in the planning area, this increase would likely only contribute to maintaining the numbers of bald eagles using the area. Activities proposed to occur on BOR lands in the Prineville Reservoir area are likely to limit eagle use. This expected increase would be due to the direction in CTA for protecting and improving bald eagle nesting habitat and the BLM Special Status Species policy that directs the BLM to manage for the recovery of federally listed species. Also, the direction in Common to Alternatives 2-7 would identify existing bald eagle habitat and identified potential eagle habitat with a primary emphasis for eagles.

Sage Grouse, Deer and Elk

Transportation
In the North Millican geographic area an HE analysis was done for sage grouse, deer and elk habitats using all BLM recognized roads and motorized trails located on BLM-administered lands. The results identified HE scores of 19 percent for sage grouse, 24 percent for deer and 26 percent for elk when considering all of these roads and motorized trails. For the analysis of effects to wildlife, this road and trail system is used. However, while it is common to Alternatives 2-7 that the trail system in North Millican will be re-aligned to better meet the needs of the OHV rider, for the analysis, it is assumed that a similar trail system (with equal densities of trails) will replace the old one, except where specifically stated otherwise (i.e., Alternative 7). Also, while this area consistently receives low HE results, some alternatives seasonally close this area to mitigate the effects on important seasonal wildlife habitats. Therefore, North Millican has a range of different emphasis levels, regardless of the roads and trail density. This information is not repeated in any of the alternatives, but is considered in the analysis of effect of all alternatives. Please note that HE is calculated by alternative for arterial and collector roads and the results are presented in each alternative.

Cumulative Effects/Conclusion
Positive changes in wildlife habitat conditions and subsequent increased population numbers is a long-term process and requires considerable amounts of time and coordinated work to be accomplished before the habitat can even begin to grow toward a suitable condition. Therefore, expected improvement in wildlife habitat conditions and maintenance or increases in wildlife populations would be a long-term result of proposed actions within the planning area.

Townsend's Big-eared Bat
Pictograph Cave: Management direction would seasonally protect hibernating bats. Seasonal closures would be maintained for bat hibernacula from October 15 – May 1.

The Redmond Caves have only received general surveys, but one Townsend's Big-eared bat was documented using the site (Perkins, 1998[3]). Alternatives 2-7 would seek to provide suitable habitat for the restoration of bat populations (including Townsend's big-eared bats) in a portion of the lava tube system known as Redmond Caves. Human uses may be excluded from some portion of the system. The other caves would be allowed to be developed for interpretive purposes. If this site is developed for interpretive purposes and the related human activities could result in alterations of the air flow into the cave, and/or cause noise-related disturbance that could reduce the suitability of the site either as a summer roost and nursery colony or for winter hibernation. Developing the site for interpretive purposes could provide long-term recognition of the sensitivity of cave resources and increased appreciation and support for bat conservation efforts.

Deer and elk

Emphasis Areas
The Northwest, Smith Rock, Steamboat Rock and Tumalo geographic areas provide considerable amounts of BLM-administered lands to be managed as a primary emphasis for deer and elk winter range. Northwest, Smith Rock and Tumalo are located in and would provide for three different ODFW recognized deer winter ranges.

The Northern portion of the La Pine geographic area would be managed with a primary emphasis for deer migration and elk winter range habitats.

Cumulative Effects
The Forest Service manages deer winter range, with an emphasis for high use, on lands immediately adjacent to the plan area. Deer herds use both ownerships together and sometimes move back and forth depending on weather conditions. As a general example, the Forest Service manages approximately 209,822 acres of deer winter range immediately adjacent to the plan area. The average HE of this habitat, in relation to arterial and collector roads, is 48 percent. A more specific example is where the Deschutes National Forest is currently proposing management activities on over 48,600 acres of deer winter range in the Pine Mountain area. "Providing high quality winter forage in adequate quantity and distribution to meet nutritional demands of wintering mule deer" was a primary wildlife objective during the planning of the Opine project (Lowrie, Wildlife Report, 2003). The East Fort Rock OHV Trail System is also located adjacent to the BLM planning area boundary and occupies some of the same area as the Opine project. This OHV trail system is open year-round and when coupled with roads has a high motorized travel route density, which is not favorable to deer habitat management.

Private lands also play a role in managing for healthy deer herds. Fencing, urban development and some agricultural practices are a few examples of actions on private lands that can have negative effects on deer and their habitats. Water development, certain agricultural practices and limiting human access to private lands are a few examples of actions on private lands that help contribute effective habitat for deer. The creation of a new West Butte/Millican "Highway" will increase motorized travel along this travel route and increase the amount of human visitation the BLM lands (and deer habitat) will receive in the near future.

Alternative 2

Emphasis Areas
Alternative 1 provides the least amount (25 percent) of the planning area with having a primary emphasis toward wildlife and subsequently the highest amount (70 percent)

[3] Perkins, J. Mark. 1998. Results of Mist netting and bat trapping at Redmond Caves and selected mine sites for Prineville District, Prineville, Oregon. U.S.D.A. Forest Service, Pacific Northwest Research Station, Bat Research Team.

with having a minor emphasis (refer to comparison tables for wildlife emphasis areas). This alternative would provide a poor distribution of habitats across the planning area that would be managed with a primary wildlife emphasis.

(Alternative 2 provides the same primary wildlife emphasis areas as described in Common to Alternatives 2-7, and is not included here.)

The following are additional components of this alternative:
- Badlands and Horse Ridge provide the largest contiguous block of area where wildlife would be a primary emphasis.
- Managing with a primary emphasis is most often achieved through seasonal closures. However, the seasonal closure in the Horse Ridge area does not cover the entire sage grouse season.
- This alternative would identify the largest amount (79 percent) of sage grouse habitat in the planning area that would have a minor emphasis.

Golden Eagle

Emphasis Areas
The direct effect of Alternative 2 on golden eagle nesting and adjacent foraging habitats would be the allocation of 15,313 acres (38 percent of all adjacent foraging habitats) for managing with a primary emphasis, 2,658 acres (7 percent) with a secondary, and 21,996 acres (55 percent) with a minor emphasis for eagles. This alternative provides the lowest amount of habitat to be managed with a primary emphasis for golden eagles.

Sage Grouse

Emphasis Areas
The direct effect of Alternative 2, on sage grouse habitats would be the allocation of 15,416 acres (20 percent of all sage grouse habitats) for managing with a primary emphasis, 268 acres (1 percent) with a secondary emphasis, and 61,919 (79 percent) with a minor emphasis for sage grouse. This alternative provides the 5th highest amount of lands to be managed at a primary emphasis. Horse Ridge provides most (93 percent) of the acres to be managed at a primary emphasis level, which would result in poor distribution of habitat across the planning area that would be managed with an emphasis for sage grouse.

Habitat Effectiveness
For Alternative 2, sage grouse habitats on BLM-administered lands in the planning area would have an average 48 percent HE in relation to arterial and collector routes. Alternative 2 provides no seasonal closures during the winter breeding or nesting seasons in the Millican Plateau, North Millican and South Millican geographic areas. Horse Ridge also does not have a seasonal closure, but motorized travel would be limited to designated roads only.

Cumulative Effects
BLM manages an additional 78,827 acres of sage grouse habitat outside but adjacent to the planning area with an HE of 57 percent (considering only arterial and collector roads).

The Forest Service manages 16,795 acres of sage grouse habitats adjacent to the planning area with an HE of 49 percent (considering only arterial and collector roads). Some of this area is located in the East Fork Rock OHV trail system, which is open year-round.

There are approximately 52,906 acres of sage grouse habitat located on private lands within the planning area that have an HE of 67 percent (considering only arterial and

collector roads). Outside the planning area there are 26, 599 acres of sage grouse habitat located on private lands and they have an HE of 62 percent (considering only arterial and collector roads).

Cumulative effects of the combined activities on BLM-administered lands and actions on other lands in and immediately adjacent to the planning area are expected to result in a decline in sage grouse habitat quality and in the numbers of sage grouse in the planning area. This expected decline would be due to the high levels of year-round motorized use associated with the high densities of motorized roads and trails; the low HE score in the North Millican geographic area (based on all roads and trails); the low HE score for all sage grouse habitats in the planning area (based on only arterial and collector roads); and adjacent BLM and Forest Service habitats (based on arterial and collector roads). Additionally, this alternative would manage plant communities in their current distribution, would manage against the restoration of sage grouse and their habitats and would promote the conversion of shrub-steppe communities to juniper woodlands.

Townsend's Big-eared Bat

Pictograph Cave: Alternatives 2 and 4 are essentially the same in that they allow bolted climbing routes and maintain a seasonal closure for the bat's hibernacula use. However, Alternative 2 differs from Alternative 4 in that it closes portions of the cave to installation of bolted climbing routes to protect archeological resources. This has the potential to reduce disturbance impacts to bats.

Deer

Emphasis Areas
In addition to CT 2-7, the direct effect of Alternative 2, on deer winter range would be the allocation of 84,626 acres (32 percent of all deer winter range) for managing with a primary emphasis, 15,691 acres (6 percent) with a secondary emphasis, and 163,189 acres (62 percent) with a minor emphasis for deer. This alternative provides the least amount of lands to be managed at a primary emphasis and subsequently provides the least distribution of winter range across the planning area that would be managed with a primary emphasis for deer. Horse Ridge and the Badlands geographic areas provide the largest, most contiguous piece of BLM-administered lands for deer winter range.

Additionally, in La Pine, Alternative 2 would manage 18 percent (7,449 ac.) of the deer migration corridor with a primary emphasis and 82 percent (33,194 ac.) with a minor emphasis for deer. This allocation of lands would result in a low distribution of habitat across the migration corridor that would be managed with a primary emphasis for deer and would only cover the northern high use area. This alternative would provide the lowest amount (along with Alternatives 4 and 5) of BLM-administered lands that would be managed with a primary emphasis for the deer migration corridor.

Transportation
Alternative 2 would manage arterial and collector roads the same as described in Alternative 1. Refer to Table 4-4 Table for a complete listing of the habitat effectiveness for each alternative and geographic area. The three geographic areas (Badlands, Smith Rock and Steamboat Rock) that would manage arterial and collector roads with an HE over 70 percent would also be managed with a primary emphasis for deer winter range in this alternative.

Of the 4 geographic areas (Cline Buttes, Northwest, Prineville and Prineville Reservoir) that would manage arterial and collector roads for greater than 50 percent HE, which would maintain a moderate ability to manage local roads at a secondary emphasis level, only Northwest and Prineville geographic areas would emphasize (primary or secondary) deer winter range.

The remaining geographic areas would manage arterial and collector roads below 50 percent HE resulting in a difficult situation to manage for a minimum of a secondary emphasis. Potentially, many local roads and some arterial and collector roads would need to be permanently or seasonally closed to manage for deer winter range. For this alternative, Horse Ridge and Tumalo would be managed with a primary emphasis for deer and need travel restrictions.

Cumulative Effects
BLM manages an additional 42,829 acres of deer winter range outside but adjacent to the planning area with an HE of 53 percent (considering only arterial and collector roads).

The Forest Service manages 209,822 acres of deer winter range adjacent to the planning area with an HE of 48 percent (considering only arterial and collector roads). Some of this area is located in the East Fork Rock OHV trail system, which is open year-round.

There are approximately 133,255 acres of deer winter range located on private lands within and outside (but adjacent to) the planning area that have an HE of 53 percent (considering only arterial and collector roads). This acreage figure only includes agricultural lands. Property listed by the Counties as "urban" were removed from consideration as contributing to winter habitat.

Cumulative effects of combined activities of Alternative 2 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in a decline in deer habitat quality and in the numbers of deer. This expected decline would be due to the anticipated high amount of winter use on 62 percent of the deer winter range by motorized vehicles in the planning area.

Elk

Emphasis Areas
The direct effect of Alternative 2, on elk winter range would be the allocation of 57,472 acres (32 percent of all elk winter range) for managing with a primary emphasis, 2,001 acres (1 percent) with a secondary emphasis, and 120,699 acres (67 percent) with a minor emphasis for elk. This alternative provides the lowest amount of lands to be managed with a primary emphasis and provides the highest amount of lands to be managed with a minor emphasis for elk. Subsequently, this alternative provides a low distribution of winter range across the planning area that would be managed with a primary emphasis for elk.

Additionally, Alternative 2 would manage 17 percent (1,342 ac.) of elk connectivity habitat with a primary emphasis; one percent (119 ac.) with a secondary emphasis and 82 percent (6,728 ac.) with a minor emphasis for elk (refer to Table 2-25, Alternative 2 Summary of Connectivity Corridors). This allocation of lands would result in a low amount and distribution of habitat within the migration corridor that would be managed with an emphasis (primary and secondary) for elk. This area would be open year-round to motorized travel on roads and trails, which would limit elk use.

Transportation
Overall, Alternative 2 would manage arterial and collector roads so their effect on elk winter range would result in a habitat effectiveness of 57 percent across the planning area on BLM-administered lands. Refer to Table 4-4 for a complete listing of the habitat effectiveness for each geographic area. Of the 13 geographic areas that contain elk winter range, two (Badlands and Steamboat Rock) would retain over 70 percent HE and maintain a high ability to manage local roads and achieve a primary emphasis level for elk. These two areas would also be managed with a primary emphasis for elk winter range.

Four geographic areas (Cline Buttes, Millican Plateau, Northwest, and Prineville Reservoir) would manage arterial and collector roads with HE between 50 percent and 70 percent, which would maintain a moderate ability to manage local roads at a secondary emphasis level. However, only the Northwest geographic area would emphasize (primary or secondary) any considerable amount of elk winter range for elk in this alternative.

The remaining geographic areas (Horse Ridge, La Pine, Mayfield, North Millican, South Millican, Prineville and Tumalo) would manage arterial and collector roads below 50 percent HE resulting in a limited ability to manage for a minimum of a secondary emphasis. Potentially, many local roads and some arterial and collector roads would need to be permanently or seasonally closed to manage for elk. For Alternative 2, all of Horse Ridge and Tumalo would be managed with a primary emphasis for elk, requiring a considerable amount of travel restrictions, and most of Prineville geographic area would be managed with a secondary emphasis, requiring some travel restrictions.

Cumulative Effects
BLM manages an additional 12,405 acres of elk winter range outside but adjacent to the planning area with an HE of 67 percent (considering only arterial and collector roads).

The Forest Service manages 175,374 acres of elk winter range adjacent to the planning area with an HE of 47 percent (considering only arterial and collector roads). Some of this area is located in the East Fork Rock OHV trail system, which is open year-round.

There are approximately 24,250 acres inside and 177,046 acres of elk winter range located on private lands outside (but adjacent to) the planning area that have an HE of 67 percent (considering only arterial and collector roads) for both inside and outside the planning area. This acreage figure only includes agricultural lands. Property listed by the Counties as "urban" were removed from consideration as contributing to winter habitat.

Cumulative effects of combined activities of Alternative 2 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in a decline in elk habitat quality and in the numbers of elk. This expected decline would be due the low amount of BLM-administered lands that would be managed with an emphasis (primary or secondary) for elk and the anticipated high levels of motorized use that would occur with few seasonal restrictions. Also, there would be a low distribution of elk winter range managed with an emphasis (primary or secondary) for elk located in geographic areas that contain elk winter range.

Pronghorn

Emphasis Areas
The direct effect of Alternative 2 on pronghorn habitats would be the allocation of 31,432 acres (19 percent of all pronghorn habitats) for managing with a primary emphasis, 9,833 acres (6 percent) with a secondary emphasis, and 125,913 acres (75 percent) with a minor emphasis for pronghorn. This alternative provides the lowest amount of lands to be managed with a primary emphasis and provides the highest amount of lands to be managed with a minor emphasis for pronghorn. Subsequently, this alternative would provide a low distribution of pronghorn habitats across the planning area that would be managed with a primary or secondary emphasis for pronghorn.

Additionally, Alternative 2 would manage 11 percent (2,347 ac.) of pronghorn connectivity corridors with a primary emphasis, 16 percent (3,419 ac.) with a secondary emphasis and 73 percent (15,353 ac.) with a minor emphasis for pronghorn (refer to Table 2-25, Alternative 2 Summary of Connectivity Corridors). This alternative would provide the lowest amount of connectivity habitat, of all the alternatives, with a primary or secondary emphasis for pronghorn and subsequently would result in a low distribution

of habitat across the different connectivity corridors. The minor emphasis that would be placed on the pronghorn connectivity corridors in the northern part of the Mayfield and the Millican Plateau geographic areas could limit pronghorn movements through these areas in the future.

Transportation
Alternative 2 would manage arterial and collector roads so their effects on pronghorn year-round habitats would result in an average road influence of 31 percent across the planning area on BLM-administered lands and results in a moderate level of human influence. Even though local roads are not yet factored in, having a moderate RII score indicates that BLM has the ability to manage local roads to emphasize pronghorn habitats with a secondary emphasis.

Of the nine geographic areas that contain pronghorn habitats, three (Badlands, Prineville and Prineville Reservoir) would retain less than 30 percent level of road influence on pronghorn habitats and maintain a high amount of management ability to manage local roads and achieve a primary emphasis level for pronghorn. However, these three geographic areas contain only 19 percent of the pronghorn habitat in the planning area that is located on BLM-administered lands. The Badlands would manage nearly all (9,367 ac.) pronghorn habitat with a primary emphasis for pronghorn, and Prineville would manage 76 percent (2,380 ac.) and Prineville Reservoir would manage 100 percent (1,552 ac.) of pronghorn habitats within their geographic areas with a secondary emphasis.

Six geographic areas (Bend-Redmond, Horse Ridge, Mayfield, Millican Plateau, North Millican and South Millican) would manage arterial and collector roads with a road influence between 30 percent and 50 percent, which would maintain a relatively high ability to manage local roads at a secondary emphasis level. However, Horse Ridge would be managed with a primary emphasis for pronghorn, which would probably require restrictions on many local roads and limitations on some arterial or collector roads to achieve a low level of human influence.

There would be no geographic areas that would manage arterial and collector roads with a road influence greater than 50 percent.

Cumulative Effects
BLM manages an additional 42,750 acres of pronghorn habitats outside but adjacent to the planning area with a RII of 15 percent (considering only arterial and collector roads).

The Forest Service manages 55,040 acres of pronghorn habitats adjacent to the planning area with a RII of 39 percent (considering only arterial and collector roads). Some of this area is located in the East Fork Rock OHV trail system, which is open year-round.

There are approximately 85,018 acres inside and 31,754 acres outside (but adjacent to) the planning area of pronghorn habitats located on private lands that have a RII of 17 percent (considering only arterial and collector roads) for both inside and outside the planning area. This acreage figure only includes agricultural lands. Property listed by the Counties as "urban" were removed from consideration as contributing to winter habitat.

Cumulative effects of combined activities of Alternative 2 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in a decline in pronghorn habitat quality and in the numbers of pronghorn. This expected decline would be due the low amount of BLM-administered lands that would be managed with an emphasis (primary or secondary) for pronghorn and the anticipated high levels of motorized use that would occur with no seasonal use restrictions, especially in the two geographic areas that contain the highest amounts of habitat, and the increasing fragmentation of habitat, especially due to main roads (i.e.,

West Butte/Millican Highway and Access road to the "Pronghorn" destination resort) and their associated fencing. Also, there would be a low distribution of pronghorn habitats managed with an emphasis (primary or secondary) for pronghorn located in geographic areas that contain pronghorn habitats.

Shrub-Steppe Source Habitat

Transportation
The effects of Alternative 2 on shrub-steppe source habitats and their associated species within the planning area on BLM-administered lands are the same as described for Alternative 1.

Juniper Woodland Source Habitat

Transportation
The effects of Alternative 2 on shrub-steppe source habitats and their associated species within the planning area on BLM-administered lands are the same as described for Alternative 1.

Alternative 3

Emphasis Areas
Alternative 3 provides the largest amount (63 percent) of the planning area, having a primary emphasis toward wildlife and subsequently the lowest amount (23 percent), having a minor emphasis (refer to comparison tables for wildlife emphasis areas). This alternative would provide a high distribution of habitats across the planning area that would be managed with a primary wildlife emphasis. When areas managed with a secondary emphasis are included, most wildlife interests are considered.

Alternative 3 overall is most similar to Alternative 7, but differs in management emphasis for certain species in different geographic areas. The most significant differences include:
- Alternative 3 has greater emphasis (snow closure) in the southern portion of the Millican Plateau that would benefit deer and elk and adjacent to the Crooked River (primary emphasis) that would benefit pronghorn and deer winter ranges and raptor foraging habitat;
- Alternative 3 has greater emphasis (secondary) in the Bend-Redmond block for the potential pronghorn connectivity corridor along Highway 126 and
- In La Pine, Alternative 3 identifies more acres for primary emphasis, benefiting elk winter range, deer migration corridors and ponderosa/lodgepole pine forest species.

The following are additional components of this alternative:
- While seasonal closures lessen impacts to a large amount of elk, deer and pronghorn habitats the seasons often are too short in duration to cover all sage grouse seasons of use (especially nesting season).
- Badlands would become non-motorized and potentially provide wildlife with the least amount of human disturbances on the largest contiguous block of land in the planning area.
- In Cline Buttes, this alternative would provide the most area around raptor nest sites and adjacent foraging habitats with the least amount of motorized disturbances, located in the west side canyon areas and along the Deschutes River.
- North Millican would provide adequate seasonal protection for elk, deer and sage grouse winter ranges; however, the seasonal closure period would not cover sage grouse nesting season.
- In the Mayfield area, Alternatives 3 (and 7) would provide the best combination of management emphasis that would benefit pronghorn and deer habitats.
- In the Cline Buttes area, Alternative 3 provides the greatest amount of acres managed for wildlife emphasis.

Pictograph Cave: Alternatives 1 and 3 are essentially the same in that they provide year-round protection (closure) for Pictograph Cave. However, Alternative 3 would allow some permitted interpretive use.

In Alternative 3, all significant caves and caves nominated for significance (with the exception of Redmond Caves) would be closed under the "Federal Cave Resources Protection Act" until a site management plan is developed that manages wildlife resources with a primary emphasis. Pictograph Cave would be closed except for interpretive use under permit.

Golden Eagle

Emphasis Areas
The direct effect of Alternative 3, on golden eagle nesting and adjacent foraging habitats, would be the allocation of 30,634 acres (77 percent of all adjacent foraging habitats) for managing with a primary emphasis, 1,781 acres with a secondary emphasis (4 percent), and 7,551 acres (18 percent) with a minor emphasis. This alternative provides the largest amount of habitat to be managed with a primary emphasis for golden eagles and the least to be managed with a minor emphasis.

Sage Grouse

Emphasis Areas
The direct effect of Alternative 3, on sage grouse habitats would be the allocation of 75,659 acres (98 percent of all sage grouse habitats) for managing with a primary emphasis, 1,943 acres (2 percent) with a secondary emphasis, and 0 acres (0 percent) with a minor emphasis for sage grouse. This alternative provides one of the highest amounts of lands to be managed with a primary emphasis for sage grouse. However, the seasonal closure period in the North Millican geographic area only covers the winter and breeding season, but does not cover the nesting season.

Habitat Effectiveness
For Alternative 3, sage grouse habitats on BLM-administered lands in the planning area would have an average of 67 percent HE in relation to arterial and collector routes. This provides for a fairly good opportunity to manage local roads to achieve a secondary management emphasis. But seasonal closures on some arterial or collector roads would be necessary to achieve 70 percent HE or higher.

Cumulative Effects
The cumulative effects on BLM and Forest Service lands adjacent to the planning area and on private lands in and adjacent to the planning area are the same for Alternatives 3 through 7, and are as follows:

- BLM manages an additional 72,916 acres of sage grouse habitat outside but adjacent to the planning area with an HE of 59 percent (considering only arterial and collector roads).
- The Forest Service manages 16,795 acres of sage grouse habitats adjacent to the planning area with an HE of 48 percent (considering only arterial and collector roads). Some of this area is located in the East Fork Rock OHV trail system, which is open year-round.
- There are approximately 32,349 acres of sage grouse habitat located on private lands within the planning area that have an HE of 75 percent (considering only arterial and collector roads). Outside the planning area there are 27,625 acres of sage grouse habitat located on private lands and they have an HE of 69 percent (considering only arterial and collector roads).

Cumulative effects of the combined activities on BLM-administered lands and actions on other lands in and immediately adjacent to the planning area are expected to result in an improvement in sage grouse habitat quality and a positive influence contributing to increasing the numbers of sage grouse in the planning area. This expected improvement would be due to the habitat emphasis of restoring shrub-steppe habitats to their historical distribution on BLM-administered lands, the seasonal closures in North and South Millican geographic areas and limiting motorized travel to designated roads only in the Horse Ridge area. Additionally, immediately to the south of Horse Ridge and South Millican geographic areas, the Forest Service is proposing (in the Opine project) to manage, as a priority objective, to restore shrub-steppe habitats for sage grouse on 24 percent (7,090 ac.) to 62 percent (18,315 ac.) (depending on alternative selected) of sage grouse historical habitat (Lowrie, 2003).

Deer

Emphasis Areas
In addition to CT 2-7, the direct effect of Alternative 3 on deer winter range would be the allocation of 196,450 acres (75 percent of all deer winter range) for managing with a primary emphasis, 31,896 acres (12 percent) with a secondary emphasis, and 35,160 (13 percent) with a minor emphasis for deer. This alternative (and Alternative 7) provides the highest amount of lands to be managed with a primary emphasis and provides the least amount of lands to be managed with a minor emphasis. Subsequently, this alternative provides the best distribution of winter range across the planning area that would be managed with a primary emphasis for deer.

Additionally, in La Pine, Alternative 3 would manage 96 percent (38,979 ac.) of the deer migration corridor with a primary emphasis and four percent (1664 ac.) with a minor emphasis for deer. This allocation of lands would result in a high distribution of habitat across the migration corridor that would be managed with a primary emphasis for deer. This alternative would provide the highest amount (along with Alternative 6) of BLM-administered lands that would be managed with a primary emphasis for the deer migration corridor.

Transportation
Overall, Alternative 3 would manage arterial and collector roads so their effect on deer winter range would result in a habitat effectiveness of 64 percent across the planning area on BLM-administered lands. Refer to Table 4-4 for a complete listing of the habitat effectiveness for each geographic area. Of the 14 geographic areas that contain deer winter range, five (Badlands, Cline Buttes, Mayfield, Smith Rock and Steamboat Rock) would manage for over 70 percent HE (based on arterial and collector roads) and maintain a high amount of management ability to manage local roads and achieve a primary emphasis level for deer. Cline Buttes is the only one of these geographic areas that would manage a small portion (31 percent) with a primary emphasis for deer. The rest of these geographic areas would be managed for nearly their entire area with a primary emphasis for deer winter range.

Seven geographic areas (Horse Ridge, Millican Plateau, North Millican, South Millican Northwest, Prineville and Tumalo) would manage arterial and collector roads between 50 percent and 70 percent HE and maintain a high ability to manage local roads at a secondary emphasis level, but a low ability to manage for a primary emphasis. All of Horse Ridge, North Millican, South Millican and Tumalo and almost all of Northwest geographic areas would be managed with a primary emphasis for deer and would require closing (seasonally or permanently) a lot of local roads and potentially some arterial or collector roads.

The remaining geographic areas (La Pine and Prineville Reservoir) would manage arterial and collector roads below 50 percent HE, resulting in a difficult situation to

manage for a minimum of a secondary emphasis. Potentially, many local roads and some arterial and collector roads would need to be permanently or seasonally closed to manage for deer winter range. For this alternative, both of these areas would emphasize a portion of their area for deer (winter or migration) and would require travel restrictions that result in a primary emphasis for deer.

Cumulative Effects
BLM manages an additional 42,829 acres of deer winter range outside but adjacent to the planning area with an HE of 53 percent (considering only arterial and collector roads).

The Forest Service manages 209,822 acres of deer winter range adjacent to the planning area with an HE of 48 percent (considering only arterial and collector roads). Some of this area is located in the East Fork Rock OHV trail system, which is open year-round.

There are approximately 133,255 acres of deer winter range located on private lands within and outside (but adjacent to) the planning area that have an HE of 53 percent (considering only arterial and collector roads). This acreage figure only includes agricultural lands. Property listed by the Counties as "urban" were removed from consideration as contributing to winter habitat.

Cumulative effects of combined activities of Alternative 3 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in an improvement in deer habitat quality and contribute positively to the numbers of deer. These expected positive effects would be due to the high amount (87 percent) of habitat that would be managed with either a primary emphasis (75 percent) or secondary emphasis (12 percent).

Elk

Emphasis Areas
The direct effect of Alternative 3, on elk winter range would be the allocation of 141,707 acres (79 percent of all elk winter range) for managing with a primary emphasis, 17,513 acres (10 percent) with a secondary emphasis, and 20,948 acres (12 percent) with a minor emphasis for elk. This alternative provides the highest amount of lands to be managed with a primary emphasis and provides the lowest amount of lands to be managed with a minor emphasis for elk. Subsequently, this alternative would provide a good distribution of winter range across the planning area that would be managed with a primary emphasis for elk.

Additionally, Alternative 3 would manage 82 percent (6,729 ac.) of elk connectivity habitat with a primary emphasis, 18 percent (1,461 ac.) with a secondary emphasis and no area managed with a minor emphasis for elk (refer to Table 2-34, Alternative 3 Summary of Connectivity Corridors). This allocation of lands would result in a high amount and distribution of habitat within the migration corridor that would be managed with a primary emphasis for elk. This would be accomplished using both seasonal restrictions in some areas and limiting motorized travel to a low density of designated roads in other areas.

Transportation
Overall, Alternative 3 would manage arterial and collector roads so their effect on elk winter range would result in a habitat effectiveness of 69 percent across the planning area on BLM-administered lands. Refer to Table 4-4 for a complete listing of the habitat effectiveness for each alternative and geographic area. Of the 13 geographic areas that contain elk winter range, four (Badlands, Mayfield, North Millican and Steamboat Rock) would retain over 70 percent HE and maintain a high ability to manage local roads and achieve a primary emphasis level for elk. All of these geographic areas would have all, or nearly all, of their area managed with a primary emphasis for elk.

Eight geographic areas (Cline Buttes, Horse Ridge, La Pine, Millican Plateau, South Millican, Northwest, Prineville Reservoir and Tumalo) would manage arterial and collector roads with an HE between 50 percent and 70 percent, which would maintain a high ability to manage local roads at a secondary emphasis level. However, five of these geographic areas (Horse Ridge, South Millican, Northwest, Prineville Reservoir and Tumalo) would be managed with a primary emphasis for elk requiring a considerable amount of road closures, including some arterial or collector roads to achieve ≥70 percent HE. In the Millican Plateau geographic area, Alternative 3 would manage 99 percent of elk winter range with a secondary emphasis for elk, which would be relatively easy to accomplish with the designated arterial and collector roads.

Prineville is the only geographic area in which arterial and collector roads would be managed to have below 50 percent HE, resulting in a limited ability to manage for a minimum of a secondary emphasis. Most of the Prineville geographic area would be managed with a secondary emphasis for elk, requiring some travel restrictions on arterial or collector roads to achieve ≥50 percent HE. Potentially, many local roads would also need to be permanently or seasonally closed to manage for elk winter range.

Cumulative Effects
BLM manages an additional 8,033 acres of elk winter range outside but adjacent to the planning area with an HE of 53 percent (considering only arterial and collector roads).

The Forest Service manages 175,374 acres of elk winter range adjacent to the planning area with an HE of 47 percent (considering only arterial and collector roads). Some of this area is located in the East Fork Rock OHV trail system, which is open year-round.

There are approximately 24,250 acres inside and 175,878 acres of elk winter range located on private lands outside (but adjacent to) the planning area that have an HE of 67 percent (considering only arterial and collector roads) inside and 50 percent outside the planning area. This acreage figure only includes agricultural lands. Property listed by the Counties as "urban" was removed from consideration as contributing to winter habitat.

Cumulative effects of combined activities of Alternative 3 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in an improvement in elk habitat quality and contribute positively to the numbers of elk. This expected increase would be due to the high amount (89 percent) of elk habitats that would be managed with either a primary emphasis (79 percent) or secondary emphasis (10 percent). Also, there would be a high distribution of habitats that would be managed with an emphasis (primary or secondary) located in all geographic areas that contain elk winter range.

Pronghorn

Emphasis Areas
The direct effect of Alternative 3, on pronghorn habitats would be the allocation of 80,392 acres (48 percent of all pronghorn habitats) for managing with a primary emphasis, 38,047 acres (23 percent) with a secondary emphasis, and 48,737 acres (29 percent) with a minor emphasis for pronghorn. This alternative provides the highest amount of lands to be managed with a primary emphasis and provides the lowest amount of lands to be managed with a minor emphasis for pronghorn. This alternative would provide a moderately high distribution of pronghorn habitats across the planning area that would be managed with a primary or secondary emphasis for pronghorn. The Bend-Redmond and Millican Plateau geographic areas are two areas where there would be no primary emphasis for pronghorn.

Additionally, Alternative 3 would manage 51 percent (10,762 ac.) of pronghorn connectivity corridors with a primary emphasis, 49 percent (10,313 ac.) with a secondary

emphasis and less than one percent (31 ac.) with a minor emphasis for pronghorn (refer to Table 2-34, Alternative 3 Connectivity Corridors). This alternative would provide the highest amount of connectivity habitat, of all the alternatives, with a primary or secondary emphasis for pronghorn and would result in a high distribution of habitats across all the connectivity corridors. This alternative is the only alternative that would manage the potential connectivity corridor that is located in the Bend-Redmond geographic area along Highway 126, with an emphasis for pronghorn. This emphasis, coupled with the historic vegetation management theme would provide the greatest opportunity to facilitate movements of wildlife (especially pronghorn) between the larger more contiguous BLM-administered lands in the southern part of the planning area and Smith Rock geographic area and the National Grasslands to the north.

Transportation
Alternative 3 would manage arterial and collector roads so their effects on pronghorn year-round habitats would result in an average road influence of 18 percent across the planning area on BLM-administered lands and results in a low level of human influence. Even though local roads are not yet factored in, having a low RII score indicates that BLM has a high ability to manage local roads to emphasize pronghorn habitats with a primary emphasis.

All 9 geographic areas that contain pronghorn habitats would manage arterial and collector roads with a road influence of less than 30 percent, which maintains in a low level of human influence and retains a high amount of management ability to manage local roads to manage with a primary or secondary emphasis for pronghorn.

Cumulative Effects
BLM manages an additional 42,750 acres of pronghorn habitats outside but adjacent to the planning area with a road influence index (RII) of 9 percent (considering only arterial and collector roads).

The Forest Service manages 55,040 acres of pronghorn habitats adjacent to the planning area with a RII of 39 percent (considering only arterial and collector roads). Some of this area is located in the East Fork Rock OHV trail system, which is open year-round.

There are approximately 85,018 acres inside and 31,754 acres outside (but adjacent to) the planning area of pronghorn habitats located on private lands that have a RII of 17 percent (considering only arterial and collector roads) for both inside and outside the planning area. This acreage figure only includes agricultural lands. Property listed by the Counties as "urban" were removed from consideration as contributing to winter habitat.

Cumulative effects of combined activities of Alternative 3 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in an increase in pronghorn habitat quality and in the numbers of pronghorn. This expected increase would be due the moderately-high amount and the moderate distribution of BLM-administered lands that would be managed with an emphasis (primary or secondary) for pronghorn. Also, this alternative would manage habitats toward their historical vegetative conditions and distributions, which would improve a large amount of pronghorn habitat that either has been or is being over-grown by young juniper trees.

Shrub-Steppe Source Habitat

Transportation
The analysis of transportation (motorized travel) effects on shrub-steppe source habitat (and associated wildlife species) includes all mapped roads (arterial, collector and local roads) and motorized OHV trails in the Millican Valley OHV trail system. In some geographic areas, this calculation underestimates the effects of motorized travel because

not all roads and trails are mapped and therefore are not included in the analysis. Also, some areas would be open to cross-country travel and some areas would be seasonally closed, and these areas have not been included.

Alternative 3 would manage arterial and collector roads so their effects on shrub-steppe source habitats would result in an average road influence of 32 percent across the planning area on BLM-administered lands and results in a moderate level of human influence. Local roads were also included in this analysis, so having a moderate RII score indicates that BLM has a relatively high ability to manage local roads to have a low level of human influence on shrub-steppe source habitats.

Of the 14 geographic areas that contain shrub-steppe source habitats, five (Badlands, Horse Ridge, Prineville Reservoir, Northwest and Steamboat Rock) would retain less than a 30 percent level of road influence on shrub-steppe source habitats and maintain a high ability to manage local roads with a low level of human influence on shrub-steppe source habitats. These five geographic areas contain 36 percent of the shrub-steppe source habitats in the planning area that is located on BLM-administered lands.

Seven geographic areas (Cline Buttes, Mayfield, Millican Plateau, North Millican, Prineville, Smith Rock and South Millican) would manage arterial and collector roads with a road influence between 30 percent and 50 percent, which would maintain a relatively high ability to manage local roads at a moderate level of human influence, especially since local roads are included in this analysis. These seven geographic areas would contain 60 percent of the shrub-steppe source habitats in the planning area that are located on BLM-administered lands.

The Bend-Redmond and Tumalo geographic areas would be the only geographic areas that would manage arterial and collector roads with a road influence greater than 50 percent, resulting in a high level of human influence. This would create a limited ability to manage local roads with at least a moderate level of human influence. These two geographic areas would contain four percent of the shrub-steppe source habitats in the planning area that are located on BLM-administered lands.

Juniper Woodland Source Habitat

Transportation
The analysis of transportation (motorized travel) effects on juniper woodland source habitats (and associated wildlife species) includes all mapped roads (arterial, collector and local roads) and motorized OHV trails in the Millican Valley OHV trail system. In some geographic areas, this calculation underestimates the effects of motorized travel because not all roads and trails are mapped and therefore not included in the analysis. Also, some areas would be open to cross-country travel and some areas would be seasonally closed and these areas have not been included.

Alternative 3 would manage arterial and collector roads so their effects on shrub-steppe source habitats would result in an average road influence of 25 percent across the planning area on BLM-administered lands and results in a low level of human influence. Local roads were also included in this analysis, so having a low RII score indicates that BLM has a high ability to manage local roads to have a low level of human influence on juniper woodland source habitats source habitats.

Of the 14 geographic areas that contain juniper woodland source habitats, six (Badlands, Horse Ridge, Mayfield, Millican Plateau, North Millican and Northwest) would retain less than a 30 percent level of road influence on juniper woodland source habitats and maintain a high ability to manage local roads with a low level of human influence

on juniper woodland source habitats. These six geographic areas contain 59 percent of the juniper woodland source habitats in the planning area that is located on BLM-administered lands.

Seven geographic areas (Bend-Redmond, Cline Buttes, Prineville, Prineville Reservoir, South Millican, Steamboat Rock and Tumalo) would manage arterial and collector roads with a road influence between 30 percent and 50 percent, which would maintain a relatively high ability to manage local roads at a moderate level of human influence, especially since local roads are included in this analysis. These seven geographic areas would contain 41 percent of the juniper woodland source habitats in the planning area that are located on BLM-administered lands.

Smith Rock would be the only geographic area that would manage arterial and collector roads with a road influence greater than 50 percent resulting in a high level of human influence. This would create a limited ability to manage local roads with at least a moderate level of human influence. However, this geographic contains a low amount (<1 percent) of woodlands and BLM does not have jurisdiction of the main roads (arterial or collector) in this area. Also, in Alternatives 2-7 BLM-administered lands in the Smith Rock geographic area would be closed to motorized travel.

Alternative 4

This alternative consistently provides the fifth lowest amounts of habitats in the primary and/or secondary emphasis categories and third highest amount (53 percent) of habitats in the minor emphasis category. Alternative 4 is most similar to Alternative 5, but has some considerable differences. While Alternative 4 often has moderate amounts of wildlife habitats in the primary emphasis category, it has low amounts in the secondary emphasis and as a result this alternative often has moderate amounts of wildlife habitats in the minor emphasis category. This is where Alternative 5 differs from 4. Alternative 5 often has equally divided amounts of habitats in each of the different emphasis levels.

The following are additional highlights of this alternative:
- Alternative 4 uses very few seasonal closures to mitigate impacts to wildlife resources, with exception of those common to Alternatives 2-7.
- Of all alternatives in Millican Plateau, Alternative 4 manages the most for pronghorn winter range.
- Overall, Alternative 4 provides the second least amount of wildlife habitats in either a primary or secondary wildlife emphasis level, when comparing Alternatives 2-7.

Golden Eagle

Emphasis Areas
The direct effect of Alternative 4 on golden eagle nesting and adjacent foraging habitats would be the allocation of 23,659 acres (59 percent of all adjacent foraging habitats) for managing with a primary emphasis, 3,862 acres (10 percent) with a secondary, and 12,445 acres (31 percent) with a minor emphasis for eagles. This alternative provides the 4th largest amount of habitat to be managed with a primary emphasis for golden eagles.

Sage Grouse

Emphasis Areas
The direct effect of Alternative 4, on sage grouse habitats would be the allocation of 31,622 acres (41 percent of all sage grouse habitats) for managing with a primary emphasis, 15,097 acres (19 percent) with a secondary emphasis, and 30,881 (40 percent) with a minor emphasis for sage grouse. This alternative provides the 4th highest amount of lands to be managed at a primary emphasis. Horse Ridge and South Millican geographic areas provide the main areas to be managed at a primary emphasis level,

which would result in poor distribution of habitat across the planning area that would be managed with a primary emphasis for sage grouse.

Habitat Effectiveness
For Alternative 4, sage grouse habitats on BLM-administered lands in the planning area would have an average 67 percent HE in relation to arterial and collector routes. In the North Millican geographic area, Alternative 4 provides a partial seasonal closure that covers the latter part of the winter season, most of the breeding season and none of the nesting season. While Horse Ridge doesn't have a seasonal closure, motorized travel would be limited to designated roads only.

Cumulative Effects
Cumulative effects occurring on lands outside but adjacent to the planning area on BLM and Forest Service lands and on private lands in and adjacent to the planning area are the same as described for Alternative 3.

Cumulative effects of the combined activities on BLM-administered lands and actions on other lands in and immediately adjacent to the planning area are expected to result in limited improvements in sage grouse habitat quality in the Horse Ridge and South Millican geographic areas, and a decline in sage grouse habitat quality North Millican geographic area and a decline in the numbers of sage grouse in the planning area overall. The expected improvement in habitat condition is due to limiting motorized travel to designated roads in the Horse Ridge and South Millican geographic areas coupled with some emphasis toward habitat restoration is these areas. The expected habitat decline in North Millican geographic area would be due to the high road and trail densities, which are open during most of the sensitive periods for sage grouse. Additionally, this alternative would manage plant communities in their current distribution, which would manage against the restoration of sage grouse and their habitats and would promote the conversion of shrub-steppe communities to juniper woodlands.

Townsend's Big-eared Bat
Pictograph Cave: Alternatives 2 and 4 are essentially the same in that they allow bolted climbing routes and maintain a seasonal closure for the bat's hibernacula use. However, Alternative 2 differs from Alternative 4 in that it closes portions of the cave to installation of bolted climbing routes to protect archeological resources. This has the potential to reduce disturbance impacts to bats.

Deer

Emphasis Areas
In addition to CT 2-7, the direct effect of Alternative 4, on deer winter range would be the allocation of 136,922 acres (51 percent of all deer winter range) for managing with a primary emphasis, 25,976 acres (10 percent) with a secondary emphasis, and 100,607 (38 percent) with a minor emphasis for deer. This alternative provides the 4th highest amount of lands to be managed with a primary emphasis, but provides only the 6th highest amounts of lands with a primary and secondary emphasis. This alternative would provide for a fairly-well distribution of winter range across the planning area that would be managed with at least a secondary emphasis for deer.

Additionally, in La Pine, Alternative 4 would manage 18 percent (7,449 ac.) of the deer migration corridor with a primary emphasis and 82 percent (33,194 ac.) with a minor emphasis for deer. This allocation of lands would result in a low distribution of habitat across the migration corridor that would be managed with a primary emphasis for deer and would only cover the northern high use area. This alternative would provide the lowest amount (along with Alternatives 2 and 5) of BLM-administered lands that would be managed with a primary emphasis for the deer migration corridor.

Transportation
Alternative 4 would manage arterial and collector roads so their effect on deer winter range would result in a habitat effectiveness of 64 percent across the planning area on BLM-administered lands. Refer to Table 4-4 for a complete listing of the habitat effectiveness for each geographic area. Of the 14 geographic areas that contain deer winter range, five (Badlands, Cline Buttes, Mayfield, Smith Rock and Steamboat Rock) would manage for over 70 percent HE (based on arterial and collector roads) and maintain a high amount of management ability to manage local roads and achieve a primary emphasis level for deer. Cline Buttes is the only one of these geographic areas that would not manage any portion with a primary emphasis for deer and would manage 96 percent of the area with a minor emphasis for deer. The rest of these geographic areas would manage all, or nearly all, of their area as a primary emphasis for deer winter range.

Seven geographic areas (Horse Ridge, Millican Plateau, North Millican, South Millican Northwest, Prineville and Tumalo) would manage for greater than 50 percent HE (based on arterial and collector roads) and maintain a high ability to manage local roads at a secondary emphasis level, but a low ability to manage for a primary emphasis. All of Horse Ridge, South Millican and Tumalo and almost all of Northwest geographic areas would be managed with a primary emphasis for deer and would require closing (seasonally or permanently) a lot of local roads and potentially some arterial or collector roads.

The remaining geographic areas (La Pine and Prineville Reservoir) would manage arterial and collector roads at a range of 46 percent to 49 percent HE resulting in a difficult situation to manage for a minimum of a secondary emphasis. Potentially, many local roads and some arterial and collector roads would need to be permanently or seasonally closed to manage for deer winter range. While Alternative 4 would only emphasize a small portion (18 percent) of the La Pine geographic area, Prineville Reservoir would manage 75 percent with a primary emphasis for deer.

Cumulative Effects
Cumulative effects occurring on lands outside but adjacent to the planning area on BLM and Forest Service lands and on private lands in and adjacent to the planning area are the same as described for Alternative 3.

Cumulative effects of combined activities of Alternative 4 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in maintaining and improving healthy deer habitat quality and in maintaining healthy numbers of deer. This expected maintenance would be due to the anticipated moderate amounts of deer winter range (52 percent with a primary and 10 percent with a secondary emphasis) and migration habitats (18 percent) in the planning area that would be managed with either a primary or secondary emphasis for deer seasonal habitats. Also, this alternative provides adequate direction for restoring healthy plant communities and states that deer hiding cover is an important consideration during vegetation management.

Elk

Emphasis Areas
The direct effect of Alternative 4, on elk winter range would be the allocation of 70,311 acres (38 percent of all elk winter range) for managing with a primary emphasis, 13,780 acres (8 percent) with a secondary emphasis, and 99,031 acres (54 percent) with a minor emphasis for elk. This alternative provides the 5th highest amount of lands to be managed with a primary emphasis and provides the 2nd lowest amount of lands to be

Table 4-4: Roads and Wildlife Habitat Effectiveness Index Summary Table: Alternatives 1 & 2 Comparison with Alternatives 3 thru 7

Geographic Area	Sage Grouse			Mule Deer			Rocky Mountain Elk			Pronghorn Antelope[1]		
	Alts 1 &2	Alts 3 thru 7	Change between alts	Alts 1 &2	Alts 3 thru 7	Change between alts	Alts 1 &2	Alts 3 thru 7	Change between alts	Alts 1 &2	Alts 3 thru 7	Change between alts
Badlands	NA	NA	NA	80	82	+02	80	82	+02	03	02	+01
Bend/Redmond	NA	NA	NA	NA	NA	NA	NA	NA	NA	34	25	+09
Cline Buttes	NA	NA	NA	54	70	+16	62	67	+05	NA	NA	NA
Horse Ridge	43	67	+16	46	67	+21	34	57	+23	32	08	+24
La Pine	NA	NA	NA	46	46	NC	49	67	+18	NA	NA	NA
Mayfield	NA	NA	NA	44	77	+33	26	74	+48	35	21	+14
Millican Plateau	100	100	00	47	57	+10	54	66	+12	33	27	+06
North Millican	49	71	+22	48	69	+21	48	75	+27	31	17	+14
South Millican	45	55	+10	48	55	+07	47	51	+04	34	24	+10
Northwest	NA	NA	NA	55	69	+14	55	57	+02	NA	NA	NA
Prineville	NA	NA	NA	66	63	-03	43	43	00	11	11	00
Prineville Reservoir	NA	NA	NA	51	49	-02	52	55	+03	03	03	00
Steamboat Rock	NA	NA	NA	84	72	-12	73	73	00	NA	NA	NA
Smith Rock	NA	NA	NA	84	84	NC	NA	NA	NA	NA	NA	NA
Tumalo	NA	NA	NA	47	51	+04	47	51	+04	NA	NA	NA
Planning Area average	48	67	+19	56	64	+11	57	69	+12	26	18	+08

[1] Pronghorn effects analysis used a different index model than used for deer, elk and sage grouse to assess road associated impacts. The numerical score (percent) provided gives a relative ranking of the level of motorized road and trail influences on pronghorn. This figure is not a habitat effectiveness rating as used for deer, elk and sage grouse.

managed with a minor emphasis for elk. This alternative would provide a fairly low distribution of winter range across the planning area that would be managed with a primary emphasis for elk or with a secondary emphasis.

Additionally, Alternative 4 would manage 71 percent (5,842 ac.) of elk connectivity habitat with a primary emphasis; one percent (119 ac.) with a secondary emphasis; and 27 percent (2,228 ac.) with a minor emphasis for elk (refer to Table 2-43, Alternative 4 Connectivity Corridors). This allocation of lands would result in a moderately high amount and distribution of habitat within the migration corridor that would be managed with a primary emphasis for elk. This would be accomplished mainly by limiting motorized travel to a low density of designated roads.

Transportation
Alternative 4 would manage arterial and collector roads the same as Alternative 3, resulting in the same HE scores for each geographic area. However, Alternative 4 differs from Alternative 3 in the emphasis levels for some geographic areas, sometimes results in a different ability to achieve a desired threshold. These differences are the focus of the discussion below.

Of the 13 geographic areas that contain elk winter range, four (Badlands, Mayfield, North Millican and Steamboat Rock) would retain over 70 percent HE and maintain a high ability to manage local roads and achieve a primary emphasis level for elk. All of these geographic areas would have all, or nearly all, of their area managed with a primary emphasis for elk.

Eight geographic areas (Cline Buttes, Horse Ridge, La Pine, Millican Plateau, South Millican, Northwest, Prineville Reservoir and Tumalo) would manage arterial and collector roads with an HE between 50 percent and 70 percent, which would maintain a high ability to manage local roads at a secondary emphasis level. However, five of these geographic areas (Horse Ridge, South Millican, Northwest, Prineville Reservoir and Tumalo) would be managed with a primary emphasis for elk requiring a considerable amount of road closures, including some arterial or collector roads to achieve ≥70 percent HE. Most of the Millican Plateau geographic area would be managed with a secondary emphasis for elk and should be relatively easy to achieve managing only local roads.

Prineville is the only geographic areas that would manage arterial and collector roads below 50 percent HE resulting in a limited ability to manage for a minimum of a secondary emphasis. Forty three percent of the Prineville geographic area would be managed with a secondary emphasis for elk, requiring some travel restrictions on arterial or collector roads to achieve ≥50 percent HE. Potentially, many local roads would also need to be permanently or seasonally closed to manage for elk winter range.

Cumulative Effects
Cumulative effects occurring on lands outside but adjacent to the planning area on BLM and Forest Service lands and on private lands in and adjacent to the planning area are the same as described for Alternative 3.

Cumulative effects of combined activities of Alternative 4 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in a decline in elk habitat quality and in the numbers of elk. This expected decline would be due to anticipated high levels of motorized use that would occur with few seasonal restrictions. There would be a low distribution of elk winter range managed with an emphasis (primary or secondary) for elk, located in geographic areas that contain elk winter range. Also, this alternative would manage fewer habitats for elk than what is currently being managed for under the B/LP RMP.

Pronghorn

Emphasis Areas
The direct effect of Alternative 4 on pronghorn habitats would be the allocation of 57,746 acres (35 percent of all pronghorn habitats) for managing with a primary emphasis, 5,628 acres (3 percent) with a secondary emphasis, and 103,805 acres (62 percent) with a minor emphasis for pronghorn. This alternative provides the 4th highest amount of lands to be managed with a primary emphasis and provides the 2nd highest amount of lands to be managed with a minor emphasis for pronghorn. Subsequently, this alternative would provide a low distribution of pronghorn habitats across the planning area that would be managed with a primary or secondary emphasis for pronghorn.

Additionally, Alternative 4 would manage 27 percent (5,694 ac.) of pronghorn connectivity corridors with a primary emphasis, 11 percent (2,368 ac.) with a secondary emphasis and 62 percent (13,044 ac.) with a minor emphasis for pronghorn (refer to Table 2-43, Alternative 4 Connectivity Corridors). This alternative would provide a moderately low amount of lands and a moderately low distribution of habitats that would be managed with an emphasis for pronghorn.

Transportation
Alternative 4 would manage arterial and collector roads the same as described for Alternative 3.

Cumulative Effects
Alternative 4 would have the same cumulative effects described in Alternative 3 for BLM and Forest Service lands outside the planning area and private lands located inside and outside the planning area.

Cumulative effects of combined activities of Alternative 4 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in a decline in pronghorn habitat quality and in the numbers of pronghorn. This expected decline would be due the moderately low amount and the low distribution of BLM-administered lands that would be managed with an emphasis (primary or secondary) for pronghorn; the anticipated high levels of motorized use on a high density of travel routes; the very low amount of pronghorn habitat that would be closed seasonally to motorized vehicles; the increasing fragmentation of habitat, especially due to main roads (i.e., West Butte/Millican Highway and Access road to the "Pronghorn" destination resort) and their associated fencing; and this alternative would manage habitats within their current distributions, which would not improve a considerable amount of pronghorn habitat that either has been or is being over-grown by young juniper trees.

Shrub-Steppe Source Habitat

Transportation
The effects of Alternative 4 on shrub-steppe source habitats and their associated species within the planning area on BLM-administered lands are the same as described for Alternative 1.

Juniper Woodland Source Habitat

Transportation
The effects of Alternative 4 on juniper woodland source habitats and their associated species within the planning area on BLM-administered lands are the same as described for Alternative 1.

Alternative 5

Alternative 5 falls in the middle when comparing the amounts of wildlife habitats in the different management emphasis levels. The main difference of this alternative compared to the others is this alternative would manage the most acreage in the secondary emphasis category (33 percent). This is most apparent in the Mayfield, North Millican, Prineville Reservoir and the South Millican geographic areas. Alternative 5 often has nearly equal division of the amounts of habitats in each of the different emphasis levels. This alternative also provides the greatest amounts of habitat in the Steamboat Rock area that would be managed with a primary emphasis for wildlife, and the difference with other alternatives is most often greater than 40 percent.

Golden Eagle

Emphasis Areas
The direct effect of Alternative 5 on golden eagle nesting and adjacent foraging habitats would be the allocation of 19,798 acres (50 percent of all adjacent foraging habitats) for managing with a primary emphasis, 10,112 acres (25 percent) with a secondary, and 10,058 acres (25 percent) with a minor emphasis for eagles. This alternative provides the 5th largest amount habitat to be managed with a primary emphasis for golden eagles. However, this alternative provides the 3rd largest amount of habitat to be managed with a primary and secondary emphasis added together.

Sage Grouse

Emphasis Areas
The direct effect of Alternative 5 on sage grouse habitats would be the allocation of 15,895 acres (20 percent of all sage grouse habitats) for managing with a primary emphasis, 59,762 acres (77 percent) with a secondary emphasis, and 1,943 (3 percent) with a minor emphasis for sage grouse. While this alternative provides only the 5th highest amount of lands to be managed at a primary emphasis, it provides the 2nd highest of primary and secondary together. The Horse Ridge geographic area is the main area to be managed with a primary emphasis for sage grouse, which would result in poor distribution of habitat across the planning area that would be managed with a primary emphasis for sage grouse.

Habitat Effectiveness
For Alternative 5, sage grouse habitats on BLM-administered lands in the planning area would have an average 67 percent HE in relation to arterial and collector routes. In North Millican and South Millican geographic areas, Alternative 5 provides partial seasonal closures for motorized travel, which covers only part of the winter season, most of the breeding season and part of the nesting season. Part of Horse Ridge is closed year-round to motorized travel and part would be limited to designated roads only.

Cumulative Effects
Cumulative effects occurring on lands outside but adjacent to the planning area on BLM and Forest Service lands and on private lands in and adjacent to the planning area are the same as described for Alternative 3.

Cumulative effects of the combined activities on BLM-administered lands and actions on other lands in and immediately adjacent to the planning area are expected to result in limited improvements in sage grouse habitat quality located mainly in the Horse Ridge geographic area. This alternative would manage plant communities in their current distribution, which would manage against the restoration of sage grouse and their habitats and would promote the conversion of shrub-steppe communities to juniper woodlands. The North Millican geographic area would be targeted for some sage grouse habitat restoration efforts, but the retention of juniper trees for trail design and hiding

cover for deer and elk management would compromise the suitability of some of this area. Additionally, motorized travel would be allowed on a high density road and trail system during portions of different seasons important to sage grouse. Therefore, there would be an expected decline in the numbers of sage grouse in the planning area overall.

Townsend's Big-eared Bat

Pictograph Cave: Alternatives 5, 6 and 7 are the same and provide a seasonal closure for the bat's hibernacula use; restricts the use of bolted climbing routes and prohibits the use of hand drying agents.

Seasonal closures in Alternatives 2, 4, 5, 6 and 7 only targets the winter hibernation period. This cave has not been systematically surveyed to determine maternity colony use.

Deer

Emphasis Areas
In addition to CT 2-7, the direct effect of Alternative 5, on deer winter range would be the allocation of 97,563 acres (37 percent of all deer winter range) for managing with a primary emphasis, 101,478 acres (39 percent) with a secondary emphasis, and 64,471 (24 percent) with a minor emphasis for deer. This alternative provides the 5th highest amount of lands to be managed with a primary emphasis, but provides only the 3rd highest amounts of lands with a primary and secondary emphasis. This alternative would provide for a low to moderate amount of distribution of winter range across the planning area that would be managed with a primary emphasis, but when considering the secondary emphasis areas this alternative would provide a well distribution of habitats that emphasize deer.

Additionally, in La Pine, Alternative 5 would manage 18 percent (7,449 ac.) of the deer migration corridor with a primary emphasis and 82 percent (33,194 ac.) with a minor emphasis for deer. This allocation of lands would result in a low distribution of habitat across the migration corridor that would be managed with a primary emphasis for deer and would only cover the northern high use area. This alternative would provide the lowest amount (along with Alternatives 2 and 4) of BLM-administered lands that would be managed with a primary emphasis for the deer migration corridor.

Transportation
Alternative 5 is very similar to Alternative 4 in the way it would manage arterial and collector roads. However, there are a few differences in allocation to emphasis areas; for instance, Alternative 5 would manage only 7 percent of the South Millican and 13 percent of the Prineville Reservoir geographic area with a primary emphasis as compared to 100 percent and 75 percent under Alternative 4.

Cumulative Effects
Cumulative effects occurring on lands outside but adjacent to the planning area on BLM and Forest Service lands and on private lands in and adjacent to the planning area are the same as described for Alternative 3.

Cumulative effects of combined activities of Alternative 5 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in maintaining and improving healthy deer habitat quality and in maintaining healthy numbers of deer. This expected maintenance would be due to the anticipated combined amounts of deer winter range (37 percent with a primary and 39 percent with a secondary emphasis) and migration habitats (18 percent) in the planning area that would be managed with a primary emphasis for deer seasonal habitats. Also, this alternative provides adequate direction for restoring healthy plant communities

and states that deer hiding cover is an important consideration during vegetation management.

Elk

Emphasis Areas
The direct effect of Alternative 5 on elk winter range would be the allocation of 61,447 acres (34 percent of all elk winter range) for managing with a primary emphasis, 51,066 acres (28 percent) with a secondary emphasis, and 67,661 acres (38 percent) with a minor emphasis for elk. This alternative would provide the 6th highest amount of lands to be managed with a primary emphasis, but when combined with secondary emphasis areas this alternative provides the 4th highest. This alternative would provide a fairly low distribution of winter range across the planning area that would be managed with a primary emphasis for elk.
When secondary emphasis areas are considered, this alternative would provide a fairly good distribution of winter range with either a primary or secondary emphasis for elk.

Additionally, Alternative 5 would manage no areas of elk connectivity habitat with a primary emphasis, 82 percent (6,728 ac.) with a secondary emphasis and 18 percent (1,461 ac.) with a minor emphasis for elk (refer to Table 2-52, Alternative 5 Connectivity Corridors). This allocation of lands would result in a high amount and distribution of habitat within the migration corridor that would be managed with a secondary emphasis for elk. This would be accomplished mainly by limiting motorized travel to a moderate density of designated roads.

Transportation
Alternative 5 would manage arterial and collector roads the same as Alternative 3 and 4, resulting in the same HE scores for each geographic area. However, Alternative 5 differs from the other alternatives in the emphasis levels for some geographic areas, which sometimes results in a different ability to achieve a desired threshold. These differences are the focus of the discussion below.

Of the 13 geographic areas that contain elk winter range, four (Badlands, Mayfield, North Millican and Steamboat Rock) would retain over 70 percent HE and maintain a high ability to manage local roads and achieve a primary emphasis level for elk. The Badlands and Steamboat Rock geographic areas would be managed with a primary emphasis for elk. All elk winter range in Mayfield and 90 percent of elk winter range in North Millican would be managed with a secondary emphasis for elk, which should be relatively easy to accomplish because of the high HE for these areas.

Eight geographic areas (Cline Buttes, Horse Ridge, La Pine, Millican Plateau, South Millican, Northwest, Prineville Reservoir and Tumalo) would manage arterial and collector roads with an HE between 50 percent and 70 percent, which would maintain a high ability to manage local roads at a secondary emphasis level. However, three of these geographic areas (Horse Ridge, Northwest and Tumalo) would be managed with a primary emphasis for elk requiring a considerable amount of road closures, including some arterial or collector roads to achieve ≥70 percent HE. Most of the South Millican and Prineville Reservoir geographic areas would be managed with a secondary emphasis for elk and should be relatively easy to achieve managing only local roads.

Prineville is the only geographic areas that would manage arterial and collector roads below 50 percent HE resulting in a limited ability to manage for a minimum of a secondary emphasis. 81 percent of the Prineville geographic area would be managed with a primary emphasis for elk, requiring considerable travel restrictions on arterial or collector roads to achieve ≥70 percent HE. Potentially, most local roads may also need to be at least seasonally closed to manage for elk winter range.

Cumulative Effects
Cumulative effects occurring on lands outside but adjacent to the planning area on BLM and Forest Service lands and on private lands in and adjacent to the planning area are the same as described for Alternative 3.

Cumulative effects of combined activities of Alternative 5 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in a decline in elk habitat quality and the numbers of elk. This expected decline would be due to the low amount of elk habitat that would be managed with a primary emphasis for elk, and the anticipated high levels of motorized use that will occur in seasonally important habitats restrictions. There would be a low distribution of elk winter range managed with a primary emphasis for elk, located in geographic areas that contain elk winter range. This alternative would manage fewer acres with a primary emphasis for elk habitat than what is currently being managed for under the B/LP RMP. Also, some of the areas that would be managed with a secondary emphasis currently have low motorized travel routes, and it is anticipated that the OHV trail system will expand into these areas resulting in a lower HE for elk.

Pronghorn

Emphasis Areas
The direct effect of Alternative 5 on pronghorn habitats would be the allocation of 34,206 acres (20 percent of all pronghorn habitats) for managing with a primary emphasis, 65,304 acres (39 percent) with a secondary emphasis, and 67,680 acres (41 percent) with a minor emphasis for pronghorn. This alternative provides the 6th highest amount of lands to be managed with a primary emphasis and provides the 5th highest amount of lands to be managed with a minor emphasis for pronghorn. This alternative would provide a low distribution of pronghorn habitats across the planning area that would be managed with a primary emphasis for pronghorn and would provide a moderately low distribution when secondary emphasis areas are also considered.

Additionally, Alternative 5 would manage 11 percent (2,321 ac.) of pronghorn connectivity corridors with a primary emphasis, 42 percent (8,963 ac.) with a secondary emphasis and 47 percent (9,825 ac.) with a minor emphasis for pronghorn (refer to Table 2-52, Alternative 5 Connectivity Corridors). This alternative would provide a moderate amount of lands and a moderate distribution of habitats that would be managed with an emphasis for pronghorn. However, most (79 percent) of this emphasis is located in the secondary emphasis category.

Transportation
Alternative 5 would manage arterial and collector roads the same as described for Alternatives 3 and 4.

Cumulative Effects
Alternative 5 would have the same cumulative effects described in Alternative 3 for BLM and Forest Service lands outside the planning area and private lands located inside and outside the planning area.

Cumulative effects of combined activities of Alternative 5 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in a decline in pronghorn habitat quality and in the numbers of pronghorn. This expected decline would be due to the moderately low amount and moderately low distribution of BLM-administered lands that would be managed with an primary emphasis for pronghorn; the anticipated high levels of motorized use on a high density of travel routes; the limited amount of pronghorn habitat that would be closed seasonally to motorized vehicles; the increasing fragmentation of habitat, especially due to main roads (i.e., West Butte/Millican Highway and Access road to

the "Pronghorn" destination resort) and their associated fencing; and this alternative would manage habitats within their current distributions, which would not improve a considerable amount of pronghorn habitat that either has been or is being over-grown by young juniper trees. Even though this alternative would provide a moderate amount of pronghorn habitat with at least a secondary emphasis, most of this area would be in the secondary emphasis, which does not fully mitigate impacts to wintering pronghorn (short seasonal closure periods).

Shrub-Steppe Source Habitat

Transportation
The effects of Alternative 5 on shrub-steppe source habitats and their associated species within the planning area on BLM-administered lands are the same as described for Alternative 1.

Juniper Woodland Source Habitat

Transportation
The effects of Alternative 5 on juniper woodland source habitats and their associated species within the planning area on BLM-administered lands are the same as described for Alternative 1.

Alternative 6

This alternative provides the third highest amount (54 percent) of habitats where management would have a primary emphasis and the third lowest (38 percent) in the minor emphasis category. Most of the emphasis for low conflicts is located in the rural areas and very little is afforded wildlife in the urban areas.

The following are a few additional highlights of this alternative:
- In the **Millican Plateau,** along the west side of the Crooked River, this alternative provides the lowest amount of area that would have at least a secondary emphasis. This affects deer and pronghorn winter ranges.
- In the **South Millican** area, the seasonal closure dates do not cover the first month of the sage grouse breeding season, but covers nesting season.
- In the **South Millican** portion the seasonal closure dates do not cover deer, elk or sage grouse wintering seasons.
- The **North Millican** area has seasonal closure dates that cover deer, elk and sage grouse wintering (and most of sage grouse breeding) seasons, but do not cover the sage grouse nesting season.
- In the **Bend-Redmond** geographic area this is the only alternative that would manage the entire area north of Highway 126 for anything other than a minor wildlife emphasis. This could benefit pronghorn and juniper woodland source habitats, and contribute to the potential connectivity corridor leading north to the Smith Rock area and the Crooked River National Grassland.

Golden Eagle

Emphasis Areas
The direct effect of Alternative 6 on golden eagle nesting and adjacent foraging habitats would be the allocation of 26,583 acres (66 percent of all adjacent foraging habitats) for managing with a primary emphasis, 1,046 acres (3 percent) with a secondary, and 12,340 acres (31 percent) with a minor emphasis for eagles. This alternative also provides the 3rd largest amount of habitat to be managed with a primary emphasis for golden eagles. However, this alternative provides the 4th largest amount of habitat to be managed with a primary and secondary emphasis added together.

Sage Grouse

Emphasis Areas
The direct effect of Alternative 6, on sage grouse habitats would be the allocation of 59,572 acres (77 percent of all sage grouse habitats) for managing with a primary emphasis, 1,195 acres (2 percent) with a secondary emphasis, and 16,836 acres (22 percent) with a minor emphasis for sage grouse. This alternative provides the 3rd highest amounts of lands to be managed with a primary emphasis for sage grouse. With primary emphasis areas located in the Horse Ridge and North Millican geographic areas, there would be a fair distribution of habitat with a primary emphasis for sage grouse in the planning area.

Habitat Effectiveness
For Alternative 6, sage grouse habitats on BLM-administered lands in the planning area would have an average of 67 percent HE in relation to arterial and collector routes. This provides for a fairly good opportunity to manage local roads to achieve a secondary management emphasis. But seasonal closures on some arterial or collector roads would be necessary to achieve 70 percent HE or higher. The seasonal closure period in the South Millican geographic area doesn't cover the winter season, only covers part of the breeding season, but covers the whole nesting and brood-rearing seasons. The seasonal closure in the North Millican fully covers the winter and breeding season, but does not cover any nesting or brood-rearing periods.

Cumulative Effects
Cumulative effects occurring on lands outside but adjacent to the planning area on BLM and Forest Service lands and on private lands in and adjacent to the planning area are the same as described for Alternative 3.

Cumulative effects of the combined activities on BLM-administered lands and actions on other lands in and immediately adjacent to the planning area are expected to result in an improvement in sage grouse habitat quality and a positive influence toward contributing to increasing the numbers of sage grouse in the planning area. This expected improvement would be due to the habitat emphasis of restoring shrub-steppe habitats to their historical distribution on BLM-administered lands, the seasonal closures in North and South Millican geographic areas and closing part of Horse Ridge to motorized travel and limiting it to designated roads in the rest. Additionally, immediately to the south of Horse Ridge and South Millican geographic areas, the Forest Service is proposing (in the Opine project) to manage, as a priority objective, to restore shrub-steppe habitats for sage grouse on 24 percent (7,090 ac.) to 62 percent (18,315 ac.) (depending on alternative selected) of sage grouse historical habitat (Lowrie, 2003).

However, the sage grouse population may not respond as positively as expected because South Millican would be open to motorized vehicles on a high density of roads and trails during the winter period, which is an important and sensitive season for sage grouse.

Townsend's Big-eared Bat

For Pictograph Cave, Alternatives 5, 6 and 7 are the same and provide a seasonal closure for the bat's hibernacula use; and restrict the use of bolted climbing routes and prohibits the use of hand drying agents.

Deer

Emphasis Areas
In addition to CT 2-7, the direct effect of Alternative 6, on deer winter range would be the allocation of 171,429 acres (65 percent of all deer winter range) for managing with a primary emphasis, 13,165 acres (5 percent) with a secondary emphasis, and 78,920 acres

(30 percent) with a minor emphasis for deer. This alternative provides the 2nd highest amount of lands to be managed with a primary emphasis, but provides only the 4th highest amounts of lands with a primary and secondary emphasis. This alternative would provide for a good distribution of winter range across the planning area that would be managed with a primary emphasis for deer.

Additionally, in La Pine, Alternative 6 would manage 96 percent (38,971 ac.) of the deer migration corridor with a primary emphasis and four percent (1,671 ac.) with a minor emphasis for deer. This allocation of lands would result in a high distribution of habitat across the migration corridor that would be managed with a primary emphasis for deer. This alternative would provide the highest amount (along with Alternative 3) of BLM-administered lands that would be managed with a primary emphasis for the deer migration corridor.

Transportation
Alternative 6 is very similar to Alternative 5, except for the following main differences: Alternative 6 would manage 96 percent of the North Millican and 90 percent of the Prineville Reservoir geographic area with a primary emphasis as compared to 8 percent and 13 percent under Alternative 5. Also, while both Alternatives would manage 18 percent of the La Pine deer migration corridor with a primary emphasis for deer, Alternative 6 would manage an additional 78 percent with a secondary emphasis for deer.

Cumulative Effects
Cumulative effects occurring on lands outside but adjacent to the planning area on BLM and Forest Service lands and on private lands in and adjacent to the planning area are the same as described for Alternative 3.

Cumulative effects of combined activities of Alternative 6 on BLM-administered lands and actions on other lands in the planning area and immediately adjacent areas are expected to result in maintaining and improving healthy deer habitat quality and in maintaining healthy numbers of deer. This expected maintenance would be due to the relatively high amount (65 percent) of deer winter range that would be managed with a primary emphasis (and the additional 5 percent with a secondary emphasis) and the high amounts of BLM-administered lands in the migration corridor (96 percent) that would be managed with at least a secondary emphasis for deer.

Elk

Emphasis Areas
The direct effect of Alternative 6 on elk winter range would be the allocation of 127,411 acres (70 percent of all elk winter range) for managing with a primary emphasis, 3,800 acres (2 percent) with a secondary emphasis, and 48,964 acres (27 percent) with a minor emphasis for elk. This alternative would provide the 3rd highest amount of lands to be managed with a primary emphasis and the 5th lowest amount of lands to be managed with a minor emphasis for elk. This alternative would provide a fairly good distribution of winter range across the planning area that would be managed with a primary emphasis for elk.

Additionally, Alternative 6 would manage 82 percent (6,704 ac.) of elk connectivity habitat with a primary emphasis, 18 percent (1,485 ac.) with a secondary emphasis and no areas with a minor emphasis for elk (refer to Table 2-61, Alternative 6 Connectivity Corridors). This allocation of lands would result in a high amount and distribution of habitat within the migration corridor that would be managed with a primary emphasis for elk. This would be accomplished using both seasonal restrictions in some areas and limiting motorized travel to a low density of designated roads in other areas.

Transportation
Alternative 6 would manage arterial and collector roads the same as Alternative 3, 4 and 5 resulting in the same HE scores for each geographic area. However, Alternative 6 differs from the other alternatives in the emphasis levels for some geographic areas, which sometimes results in a different ability to achieve a desired threshold. These differences are the focus of the discussion below.

Of the 13 geographic areas that contain elk winter range, four (Badlands, Mayfield, North Millican and Steamboat Rock) would retain over 70 percent HE and maintain a high ability to manage local roads and achieve a primary emphasis level for elk. All of the elk winter range in the Badlands and most of the elk winter range in the North Millican and Steamboat Rock geographic areas would be managed with a primary emphasis for elk. Also, most elk winter range in Mayfield would be managed with a secondary emphasis for elk, which should be relatively easy to accomplish because of the high HE for these areas.

Eight geographic areas (Cline Buttes, Horse Ridge, La Pine, Millican Plateau, South Millican, Northwest, Prineville Reservoir and Tumalo) would manage arterial and collector roads with an HE between 50 percent and 70 percent, which would maintain a high ability to manage local roads at a secondary emphasis level. However, five of these geographic areas (Horse Ridge, La Pine, Northwest, Prineville Reservoir and Tumalo) would manage most of the winter range with a primary emphasis for elk requiring a considerable amount of road closures, including some arterial or collector roads, to achieve ≥70 percent HE.

Prineville is the only geographic area that would manage arterial and collector roads below 50 percent HE, resulting in a limited ability to manage for a minimum of a secondary emphasis. 81 percent of the Prineville geographic area would be managed with a primary emphasis for elk, requiring considerable travel restrictions on arterial or collector roads to achieve ≥70 percent HE. Potentially, most local roads would also need to be at least seasonally closed to manage for elk winter range.

Cumulative Effects
Cumulative effects occurring on lands outside but adjacent to the planning area on BLM and Forest Service lands and on private lands in and adjacent to the planning area are the same as described for Alternative 3.

Cumulative effects of combined activities of Alternative 6 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in an improvement in elk habitat quality and contribute positively to the numbers of elk. This expected increase would be due to the moderately-high amount (72 percent) of elk habitats that would be managed with either a primary emphasis (70 percent) or secondary emphasis (2 percent). Also, there would be a moderately-high distribution of habitats that would be managed with an emphasis (primary or secondary) located in most geographic areas that contain elk winter range.

Pronghorn

Emphasis Areas
The direct effect of Alternative 6, on pronghorn habitats would be the allocation of 55,660 acres (33 percent of all pronghorn habitats) for managing with a primary emphasis, 11,784 acres (7 percent) with a secondary emphasis, and 99,748 acres (60 percent) with a minor emphasis for pronghorn. This alternative provides the 5th highest amount of lands to be managed with a primary emphasis and provides the 4th highest amount of lands to be managed with a minor emphasis for pronghorn. This alternative would provide a low distribution of pronghorn habitats across the planning area that would be managed with a primary or secondary emphasis for pronghorn.

Additionally, Alternative 6 would manage 31 percent (6,582 ac.) of pronghorn connectivity corridors with a primary emphasis, 18 percent (3,866 ac.) with a secondary emphasis, and 50 percent (10,659 ac.) with a minor emphasis for pronghorn (refer to Table 2-61, Alternative 6 Connectivity Corridors). This alternative would manage a moderate amount of connectivity habitat and a moderate distribution of habitats that would be managed with an emphasis for pronghorn. This alternative, like Alternative 3, would manage some of the potential connectivity corridor located along Highway 126 with an emphasis for pronghorn, and would facilitate wildlife movement between the Bend-Redmond geographic area to the south and the Smith Rock geographic areas and the National Grasslands to the north.

Transportation
Alternative 6 would manage arterial and collector roads the same as described for Alternatives 3, 4 and 5.

Cumulative Effects
Alternative 6 would have the same cumulative effects described in Alternative 3 for BLM and Forest Service lands outside the planning area and private lands located inside and outside the planning area.

Cumulative effects of combined activities of Alternative 6 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in a decline in pronghorn habitat quality and in the numbers of pronghorn. This expected decline would be due the moderate amount and the low distribution of BLM-administered lands that would be managed with an emphasis (primary and secondary) for pronghorn; the anticipated high levels of motorized use on a high density of travel routes; the limited amount of pronghorn habitat that would be closed seasonally to motorized vehicles; and the increasing fragmentation of habitat, especially due to main roads (i.e., West Butte/Millican Highway and Access road to the "Pronghorn" destination resort) and their associated fencing.

Shrub-Steppe Source Habitat

Transportation
The effects of Alternative 6 on shrub-steppe source habitats and their associated species within the planning area on BLM-administered lands are the same as described for Alternative 3.

Juniper Woodland Source Habitat

Transportation
The effects of Alternative 6 on juniper woodland source habitats and their associated species within the planning area on BLM-administered lands are the same as described for Alternative 3.

Alternative 7

This alternative provides the second most habitats in the primary emphasis category and the combined primary and secondary emphasis categories. This alternative is most similar to alternative 3, but Alternative 7 provides 3 percent less habitats in the primary and 6 percent less in the secondary wildlife emphasis categories. Alternative 7 provides one of the least amounts of habitats with either a primary or secondary emphasis located in the Millican Plateau along the Crooked River Rim. This affects pronghorn and deer winter range and raptor foraging habitats. This alternative provides one of the best distributions of habitats throughout the planning area that would provide either a primary or secondary wildlife emphasis. One important concern is the conflict in management for sage grouse and OHVs in the North Millican area. The situation here is

the difference in approaches to managing young juniper trees growing in shrub-steppe habitats. For sage grouse management, removal of most junipers would be prudent. However, recreation management has identified a need for keeping some junipers to help maintain OHV trail locations and keeping riders on the designated trails.

Golden Eagle

Emphasis Areas
The direct effect of Alternative 7 on golden eagle nesting and adjacent foraging habitats would be the allocation of 29,161 acres (73 percent of all adjacent foraging habitats) for managing with a primary emphasis, 2,646 acres (7 percent) with a secondary, and 8,161 acres (20 percent) with a minor emphasis for eagles. This alternative provides the 2nd largest amount of habitat to be managed with a primary emphasis for golden eagles.

Sage Grouse

Emphasis Areas
The direct effect of Alternative 7 on sage grouse habitats would be the allocation of 77,601 acres (100 percent of all sage grouse habitats) for managing with a primary emphasis for sage grouse. This alternative provides the highest amount of lands possible and the best distribution of habitat to be managed with a primary emphasis for sage grouse in the planning area.

Habitat Effectiveness
For Alternative 7, sage grouse habitats on BLM-administered lands in the planning area would have an average of 67 percent HE in relation to arterial and collector routes. This provides for a fairly good opportunity to manage local roads to achieve a secondary management emphasis. But seasonal closures on some arterial or collector roads would be necessary to achieve 70 percent HE or higher. The seasonal closure period in the South Millican geographic area covers all important needs of sage grouse. The year-round closure to motorized travel in the eastern part of the Horse Ridge geographic area would fully protect sage grouse habitats, and limiting motorized travel to designated roads only in the west part would provide considerable protection to sage grouse habitat on the west side.

In the North Millican geographic area, the trail system would be open year-round. However, the density and locations of the trails would be designed to achieve at least 70 percent habitat effectiveness in order to maintain habitat conditions suitable to year-round occupation by sage grouse. While this alternative emphasizes restoration of shrub-steppe habitats, there would be some junipers retained in the North Millican geographic area for OHV trail development. The amount of junipers is not expected to negatively affect sage grouse habitat suitability.

Cumulative Effects
Cumulative effects occurring on lands outside but adjacent to the planning area on BLM and Forest Service lands and on private lands in and adjacent to the planning area are the same as described for Alternative 3.

Cumulative effects of the combined activities on BLM-administered lands and actions on other lands in and immediately adjacent to the planning area are expected to result in an improvement in sage grouse habitat quality and a positive influence on contributing to increasing the numbers of sage grouse on BLM-administered lands in the planning area. This expected improvement would be due to the habitat emphasis of restoring shrub-steppe habitats to their historical distribution on BLM-administered lands, the seasonal closures in North and South Millican geographic areas and closing part of Horse Ridge to motorized travel and limiting it to designated roads in the rest. Additionally, immediately to the south of Horse Ridge and South Millican geographic areas, the Forest

Service is proposing (in the Opine project) to manage, as a priority objective, to restore shrub-steppe habitats for sage grouse on 24 percent (7,090 ac.) to 62 percent (18,315 ac.) depending on alternative selected) of sage grouse historical habitat (Lowrie, 2003).

Townsend's Big-eared Bat

Pictograph: Alternatives 5, 6 and 7 are the same and provide a seasonal closure for the bat's hibernacula use; restricts the use of bolted climbing routes and prohibits the use of hand drying agents.

Seasonal closures in Alternatives 2, 4, 5, 6 and 7 only targets the winter hibernation period. This cave has not been systematically surveyed to determine maternity colony use.

Deer

Emphasis Areas
In addition to CT 2-7, the direct effect of Alternative 7, on deer winter range would be the allocation of 197,085 acres (75 percent of all deer winter range) for managing with a primary emphasis, 10,817 acres (4 percent) with a secondary emphasis, and 55,367 acres (21 percent) with a minor emphasis for deer. Like Alternative 3, this alternative provides the highest amount of lands to be managed with a primary emphasis, but Alternative 3 provides more areas with secondary emphasis and subsequently less areas minor emphasis for deer. Alternative 7 would provide for a good distribution of winter range across the planning area that would be managed with a primary emphasis for deer.

Additionally, in La Pine, Alternative 7 would manage 84 percent (34,225ac.) of the deer migration corridor with a primary emphasis and 16 percent (6418 ac.) with a minor emphasis for deer. This allocation of lands would result in a moderately high distribution of habitat across the migration corridor that would be managed with a primary emphasis for deer. In comparison to the other alternatives, this alternative would fall in the middle in the amount of BLM-administered lands that would be managed with a primary emphasis for the deer migration corridor.

Transportation
Alternative 7 is very similar to Alternative 3, except for the following main differences. Alternative 7 would manage 65 percent of the Mayfield, 50 percent of the Prineville and 80 percent of the La Pine (migration corridor) geographic areas with a primary emphasis for deer as compared to 100 percent, 12 percent and 96 percent, respectively, under Alternative 5.

Cumulative Effects
Cumulative effects occurring on lands outside but adjacent to the planning area on BLM and Forest Service lands and on private lands in and adjacent to the planning area are the same as described for Alternative 3.

Cumulative effects of combined activities of Alternative 7 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in maintaining and improving healthy deer habitat quality and in maintaining healthy numbers of deer. This expected maintenance would be due to the relatively high amount (65 percent) of deer winter range that would be managed with a primary emphasis (and the additional 5 percent with a secondary emphasis) and the high amounts of BLM-administered lands in the migration corridor (80 percent) that would be managed with at least a primary emphasis for deer.

Elk

Emphasis Areas
The direct effect of Alternative 7 on elk winter range would be the allocation of 132,563 acres (74 percent of all elk winter range) for managing with a primary emphasis, 4,992 acres (3 percent) with a secondary emphasis, and 42,616 acres (24 percent) with a minor emphasis for elk. This alternative would provide the 2nd highest amount of lands to be managed with a primary emphasis and the 6th lowest amount of lands to be managed with a minor emphasis for elk. This alternative would provide a good distribution of winter range across the planning area that would be managed with a primary emphasis for elk.

Additionally, Alternative 7 would manage nearly all (99 percent – 8,070 ac.) of the elk connectivity corridor with a primary emphasis, only one percent (119 ac.) with a secondary emphasis and no areas with a minor emphasis for elk (refer to Table 2-70, Alternative 7 Connectivity Corridors). This allocation of lands would result in a high amount and nearly complete distribution of habitat within the migration corridor that would be managed with a primary emphasis for elk. This would be accomplished using both seasonal restrictions in some areas and limiting motorized travel to a low density of designated roads in other areas.

Transportation
Alternative 7 would manage arterial and collector roads the same as Alternative 3, 4, 5 and 6 resulting in the same HE scores for each geographic area. However, Alternative 7 differs from the other alternatives in the emphasis levels for some geographic areas, which sometimes results in a different ability to achieve a desired threshold. These differences are the focus of the discussion below.

Of the 13 geographic areas that contain elk winter range, four (Badlands, Mayfield, North Millican and Steamboat Rock) would retain over 70 percent HE and maintain a high ability to manage local roads and achieve a primary emphasis level for elk. All of the elk winter range in the Badlands and North Millican and most of the elk winter range in the Steamboat Rock geographic areas would be managed with a primary emphasis for elk. Also, most elk winter range in Mayfield would be managed with a secondary emphasis for elk, which should be relatively easy to accomplish because of the high HE for these areas.

Eight geographic areas (Cline Buttes, Horse Ridge, La Pine, Millican Plateau, South Millican, Northwest, Prineville Reservoir and Tumalo) would manage arterial and collector roads with an HE between 50 percent and 70 percent, which would maintain a high ability to manage local roads at a secondary emphasis level. However, six of these geographic areas (Horse Ridge, La Pine, Northwest, Prineville Reservoir, South Millican and Tumalo) would manage most of the winter range with a primary emphasis for elk requiring a considerable amount of road closures, including some arterial or collector roads to achieve ≥70 percent HE.

Prineville is the only geographic areas that would manage arterial and collector roads below 50 percent HE resulting in a limited ability to manage for a minimum of a secondary emphasis. 81 percent of the Prineville geographic area would be managed with a primary emphasis and 19 percent with a secondary emphasis for elk, requiring considerable travel restrictions on arterial or collector roads to achieve ≥70 percent HE for the primary areas and ≥50 percent for the secondary emphasis areas. Potentially, most local roads would also need to be at least seasonally closed to manage for elk winter range.

Cumulative Effects
Cumulative effects occurring on lands outside but adjacent to the planning area on BLM

and Forest Service lands and on private lands in and adjacent to the planning area are the same as described for Alternative 3.

Cumulative effects of combined activities of Alternative 7 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in an improvement in elk habitat quality and contribute positively to the numbers of elk. This expected improvement would be due to the moderately-high amount (77 percent) of elk habitats that would be managed with either a primary emphasis (74 percent) or secondary emphasis (3 percent). Also, there would be a high distribution of habitats that would be managed with an emphasis (primary or secondary) located in all geographic areas that contain elk winter range.

Pronghorn

Emphasis Areas
The direct effect of Alternative 7 on pronghorn habitats would be the allocation of 76,842 acres (46 percent of all pronghorn habitats) for managing with a primary emphasis, 25,350 acres (15 percent) with a secondary emphasis, and 64,997 acres (39 percent) with a minor emphasis for pronghorn. This alternative provides the 2nd highest amount of lands to be managed with a primary emphasis and provides the 2nd lowest amount of lands to be managed with a minor emphasis for pronghorn. This alternative would provide a moderate distribution of pronghorn habitats across the planning area that would be managed with a primary emphasis for pronghorn and would provide a moderately high distribution when secondary emphasis areas are also considered.

Additionally, Alternative 7 would manage 60 percent (12,562 ac.) of pronghorn connectivity corridors with a primary emphasis, 11 percent (2,392 ac.) with a secondary emphasis and 29 percent (10,659 ac.) with a minor emphasis for pronghorn (refer to Table 2-70, Alternative 7 Connectivity Corridors). This alternative would manage a moderately high amount of connectivity habitat with a moderately high distribution of habitats that would be managed with an emphasis for pronghorn. This alternative would not manage for pronghorn in the Millican Plateau geographic area corridor that connects to the Mayfield area and may limit pronghorn movements between the two areas.

Transportation
Alternative 7 would manage arterial and collector roads the same as described for Alternatives 3, 4, 5 and 6.

Cumulative Effects
Alternative 7 would have the same cumulative effects described in Alternative 3 for BLM and Forest Service lands outside the planning area and private lands located inside and outside the planning area.

Cumulative effects of combined activities of Alternative 7 on BLM-administered lands and actions on other lands in the planning area, and immediately adjacent areas, are expected to result in an increase in pronghorn habitat quality and in the numbers of pronghorn. This expected increase would be due the moderately-high amount and the moderate distribution of BLM-administered lands that would be managed with an emphasis (primary or secondary) for pronghorn. Also, this alternative would manage habitats toward their historical vegetative conditions and distributions, which would improve a large amount of pronghorn habitat that either has been or is being over-grown by young juniper trees.

Shrub-Steppe Source Habitat

Transportation
The effects of Alternative 7 on shrub-steppe source habitats and their associated species within the planning area on BLM-administered lands are the same as described for Alternative 3.

Juniper Woodland Source Habitat

Transportation
The effects of Alternative 7 on juniper woodland source habitats and their associated species within the planning area on BLM-administered lands are the same as described for Alternative 3.

Fisheries

Summary

The BLM is mandated to manage the fisheries habitat for fish species present on public lands. The actual fish populations and management of species is controlled by the Oregon Department of Fish and Wildlife. Because of this, the effects analysis will focus on impacts to fisheries habitat. Fish species and locations were described in Chapter 1.

Assumptions

- Grazing prescriptions for alternatives that would continue to allow grazing would be as outlined in the B/LP RMP.
- Grazing prescriptions allow riparian recovery at or near natural recovery rates.
- Grazing prescriptions would be followed
- Grazing impacts would be consistent with those described in Ehrhart and Hansen (1997) and Leonard *et al.* (1997).

Analysis of the Alternatives

Vegetation, Recreation, Motorized Roads and Trails, and Transportation and Utility Corridor Management
The above actions affect fisheries habitat by the potential to impact riparian vegetation and water quality. Please review the Riparian and Water Quality sections for potential impacts to fisheries habitat.

Grazing Management
Potential impacts to fisheries from grazing management would be to fisheries habitat, which would include riparian vegetation and stream banks. These potential impacts could include removal of vegetation and shearing of streambanks, which are used for velocity and overhead cover.

Alternatives 1, 2, 3, and 6 would continue the grazing prescriptions as outlined in the Brothers La Pine Grazing EIS. These grazing prescriptions are short duration, deferred rotation, or early season use. They have all been shown to improve riparian habitat and stream channels over time (Herat and Hansen, 1997). Potential impacts to fisheries habitat as described above are not expected to occur due to the timing and duration of the grazing prescriptions.

Alternatives 4, 5, and 7 would discontinue or reduce the acreage where grazing is allowed. Expected effects are that riparian areas and stream channels would recover at natural rates where grazing has been removed and at or near natural rates on streams where grazing is allowed to continue. Potential impacts to the fisheries habitat are the

same as Alternatives 1, 2, 3, and 6, for allotments that would continued to be grazed and no impacts will occur where grazing has been removed.

Under the mandate promulgated by the 1996 amendment to the Magnuson-Stevens Act, consultation is required for all federal agency actions that may adversely affect Effective Fish Habitat (EFH). For the planning area EFH would pertain to occupied or historic spring chinook habitat, which would be the Crooked River. At this point and time it does not appear that any of the alternatives would affect spring chinook EFH. Once a final decision is made, an EFH determination will be submitted to NOAA Fisheries for review.

Hydrology

Summary

This section includes discussion on watersheds, hydrologic function, riparian and water quality. Decisions in the RMP that have a direct effect on water resources are the designation of collector and local roads, establishment of objectives and guidelines of RCAs, designation of high priority restoration areas, designation of areas to motorized use as Open, Closed, or Limited (limited to designated roads and trails or roads only), designation of areas available for grazing, and the designation of transportation corridors.

Indirect effects on water resources are the effects that are reasonably foreseeable as a result of implementing the RMP such as infiltration rates; changes in overland flow, routing of water, and erosion; changes in timing of streamflows and riparian vegetation; potential for livestock use on riparian vegetation; and changes in water quality.

All action alternatives (Common to Alternatives 2-7) would potentially improve hydrologic function and result in less direct impacts to RCAs, riparian vegetation, and water quality relative to Alternative 1, no action. Alternatives 3, 5, 6, and 7 would be the least disruptive to hydrologic function, with Alternatives 3 and 7 better maintaining hydrologic function within the Bear Creek area and Cline Buttes area adjacent to the Deschutes River, Alternative 5 on Horse Ridge, and Alternative 6 on Horse Ridge and within Smith Canyon. In addition, Alternatives 3, 6 and 7 would have more closed areas to motorized use in the south-central portion of the planning area, in the vicinity of Horse Ridge, Smith Canyon, and the Badlands, and in the Tumalo area. Closed areas on intermittent and ephemeral streams for Alternative 6 would reduce potential for sedimentation within the Badlands, Horse Ridge, and Tumalo areas. The water quality within these intermittent and ephemeral stream channels would likely be improved for the beneficial uses of livestock and wildlife.

Potential to affect perennial streams south of Prineville Reservoir such as Bear Creek, Sanford, Creek and Deer Creek through extension of the drainage network would be least with Alternatives 3 and 7 since the Bear Creek Buttes area and the entire area south of Prineville Reservoir would be designated as roads only. This would reduce the potential for water and sediment derived from motorized trails to enter perennial stream channels and intermittent channels, which would ultimately flow into the perennial streams. Alternative 7 would go one step further in reducing potential for routing of sediment and water on motorized trails to Bear Creek by designating the tributary watershed, Sage Hollow, to designated roads only. Improvements to water quality in these perennial streams would support and maintain many beneficial uses, including domestic, livestock, irrigation, recreation, wildlife and fish. Designation of the area in the vicinity of Sage Hollow for motorized use on roads and trails with Alternative 3 would result in potential for more sediment and water being routed to Sage Hollow and Bear Creek

Intermittent and ephemeral streams in the Cline Buttes area may become hydrologically connected to the road and trail network more so with Alternatives 4, 5, 6 and 7 as compared with Alternative 3 because the Cline Buttes area would be closed in alternative 3 vs. open to roads only in alternatives 5, and open to roads and trails in alternative 4, 6 and 7. Potential for routing of sediment and water via the recreation road surfaces on Cline Buttes is the least with Alternative 3 since the whole Cline Buttes area is closed to motorized vehicles, and is reduced with Alternatives 5 and 7 due to the closed area to the east of Cline Buttes adjacent to the basalt rim of the Deschutes River. The closed area in alternatives 5 and 7 will reduce the potential conduits for transport of sediment and water off of Cline Buttes and into the Deschutes River.

Horse Ridge would be designated for roads only in Alternatives 2, 3 and 4 vs. closed to motorized use in Alternatives 5, 6, and 7. Thus, potential for transport of sediment and water to the ephemeral channels in the Horse Ridge area is greatest for Alternatives 3 and 4 as compared with Alternatives 5, 6, and 7. However, effects would be limited to the ephemeral channels on Horse Ridge, and possibly Dry River, as these stream channels do not flow into any perennial streams.

Assumptions

Vegetation

Western juniper affects the hydrologic cycle of a watershed through canopy interception, evapotranspiration, and competition for resources (water/nutrients) with associated vegetative species. Current conditions have allowed present-day juniper woodlands to become considerably denser than in the recent past. On many sites within the planning area, post-settlement expansion of western juniper has altered the hydrologic function within the shrub-steppe community due to high rates of canopy interception and evapotranspiration. As a result, soil cover by forbs, grasses, and shrubs has declined in the interspace between juniper canopies (Miller *et al.*, 1989; Miller and Wigand, 1994). Vegetative cover acts as an obstruction to overland flow that increases "residence time," or the length of time water remains on the surface before running off. The longer the residence time, the higher the likelihood of increased infiltration. Slope and surface roughness also determine residence time. Where soil cover is reduced, residence time and infiltration is reduced and water does not readily enter the soil. As a result, less water is stored for plant growth and plant production declines, and runoff erodes soil from the surface through either sheet erosion or rill and gully erosion (Trimble and Mendel, 1995; Clary *et al.*, 1996). Continued soil loss over time can result in crossing a threshold to a lower site potential (Borman, 1996; Dobrowolski, 2000; Eddleman, 1991; USDA Natural Resources Conservation Service, 2001). Sediment derived from this erosion process may contribute to downstream sedimentation of perennial and intermittent stream channels.

When infiltration is low and overland flow is high, a change in timing and amount of peak flows in stream channels may occur, making the system "flashier" (flow events will occur more quickly). While the total runoff does not change, the distribution does, with potentially higher peak flows and reduced flow duration. Those streams located in watersheds with reduced ground cover and steeper slopes, as is the case for areas mapped as High Priority for Restoration, are likely experiencing increased peak flows and reduced flow duration. Therefore, stream channel banks and the associated riparian vegetation are eroded during high flow events, and riparian vegetation is stressed or limited due to the reduced time that water actually remains in the channel. Areas mapped as High Priority for Restoration would benefit the most in terms of hydrologic function and reduced erosion by the removal of post-settlement juniper, primarily due to the higher slopes and amount of bare ground between juniper canopies. The response of plant community composition and structure following juniper removal is highly variable. However, following juniper removal, the annual native perennial forbs and grasses tend to respond the most on sites with shallow soils or south facing slopes (Miller and

Wigand, 1994). Data from the past 20 years in existing juniper removal treatment sites within the area mapped as High Priority for Restoration indicate a 9-20 percent decrease in bare ground, and a 1-11 percent increase in grasses.

Vegetation treatments proposed for all alternatives include mechanical and prescribed fire. Wildfires have been found to accelerate erosion rates because vegetation is an important factor controlling erosion. Factors that control the erosion processes include the prevailing climate, geology and topography, and the type of fire regime that disrupts vegetative cover. Surface erosion, caused by overland flow, is a dominant response to wildfire in the Interior Northwest. (Wondzell and King, In Press). Intense wildfires would likely cause greater susceptibility to surface erosion and mass wasting than would prescribed fire or mechanical removal of western juniper due to less consumption of surface organic matter and less probability that soils would become hydrophobic (water-repellent). Preliminary results for mountain big sagebrush prescribed fire and wildfires in Oregon, Nevada and California by Miller (2003) indicate that perennial and annual forbs increase in the burned areas; litter cover decreases from 4.5 percent to less than 1 percent following a fire but approaches pre-burn levels after three growing seasons, and; bare ground is increased from one to three years following fire.

Burning the vegetation on upland watersheds can affect downslope riparian areas indirectly through changes on surrounding hillslopes. Soil erosion can increase when the burned soil surface becomes exposed to water and wind, although much of the eroded soil materials often only move short distances downslope before stabilizing (DeBano *et al.*, 1998). Although periodic, large influxes of sediment to channels are a fundamental part of stream ecosystems, intense wildfires may cause rill and gully erosion, which increases the amount of sediment that is deposited on valley floors and in stream channels. However, while influxes of sediment to stream channels have both immediate, often detrimental, impacts on aquatic communities, these effects are often patchy and are essential in the creation and maintenance of certain channel and riparian landforms (Benda *et al.*, In Press; Miller *et al.*; In Press).

Riparian communities have been replaced by western juniper due to the reduced occurrence of fire (Miller and Tausch, 2001). Conifer expansion into riparian zones competes directly with riparian vegetation such as willow, currant, and bitter cherry to the detriment of the riparian habitat. Riparian shrubs and trees provide more bank and floodplain cover and roughness, and better protect streambanks and floodplains from excessive erosion. In eastern Washington, Liquori and Jackson (2001) found that fire suppression and/or lack of active riparian zone management resulted in dense encroachment of fir forests, which led to poor channel morphology and higher water temperatures relative to streams with scrub-shrub riparian vegetation.

For vegetative treatments using prescribed fire, riparian plant species may be directly affected, but they generally possess adaptations to fluvial disturbances that facilitate survival, recovery, and reestablishment following fires (Dwire, In Press). In addition, many of the riparian plant species found in the planning area will resprout or reestablish by seed, including water birch, serviceberry, chokecherry, currant, and red osier dogwood (Howard, 1997; Tesky, 1992; Johnson, 2000). White alder would likely be killed if the fire was severe (Uchytil, 1989). Intense wildfires can cause severe damage to vegetative covers, while a low-intensity burn, typical of prescribed burns, is likely to have less severe consequences (DeBano *et al.*, 1998). Those areas mapped as High Priority for Restoration, the Aquatic Stronghold Restoration Priorities, and Canyon treatments would respond to a reduction in young conifers within the riparian areas with more vigorous riparian vegetation and improved channel morphology and water quality.

For all alternatives, livestock grazing allotments will be evaluated according to the Fundamentals of Rangeland Health. These standards require properly functioning physical conditions so that: 1) soil and plant conditions support infiltration, and soil

moisture storage and the release of water are in balance with the climate and landform; 2) water quality meets state standards; and 3) riparian-wetland areas are in properly functioning physical condition. Where the standards are not being met, vegetation would be managed to sustain hydrologic processes to improve surface runoff and subsequent riparian function and water quality.

The BLM and Forest Service will jointly prepare a Water Quality Restoration Plan to comply with the Federal Clean Water Act in addressing 303(d) listed streams. This plan will include actions BLM would need to implement to improve water quality in BLM-administered streams and rivers.

Fuels treatments within the Wildland Urban Interface will not be analyzed for effects to hydrologic function because most treatments will occur on relatively flat ground and effects to hydrologic function, water quantity, and water quality are expected to be minimal. Analysis of fuel treatments will occur in site-specific NEPA documents for each project.

Analysis of the alternatives is based on projected or likely vegetation treatments that would occur within the High Priority Restoration areas, Aquatic Stronghold areas, sage grouse treatment areas, and canyon treatment areas. Within the vegetation treatment areas, the potential for improvement to upland hydrologic function is determined by the acres of post-settlement juniper management. The potential for more riparian-type vegetation and improved channel stability and water quality is determined by the miles of stream within the possible priority areas. Decisions in the plan will determine where, and to what extent, the priority for vegetation treatments will occur. Thus, the acres of potential treatment and miles of streams within those treatment areas will give a relative difference by alternative as to the potential improvement to water quality. More site-specific analysis will be completed prior to implementation of any vegetation treatments.

Recreation-Motorized Roads and Trails

Roads and trails effectively increase the drainage network of the watershed through compaction of the road surface and interception of groundwater, thereby creating a more efficient drainage network. Where surface flows are continuous between roads and streams, the road generating or receiving the runoff is considered "hydrologically connected" to the stream network (Wemple, and Grant 1996; Furniss *et al.*, 2000). As a result, a change in timing and amount of peak flows may occur making the system "flashier," meaning the flow events occur more quickly. While the total runoff does not change, the distribution does, with potentially higher peak flows and reduced flow duration. The effects of an increased drainage network are most prevalent on midslope or roads located higher on hillslopes.

With a "flashier" system and potentially higher peak flows, stream channel banks and the associated riparian vegetation are eroded during high flow events, and riparian vegetation is stressed or limited due to reduced time water remains in the channel. In addition, roads that are located adjacent to or within the floodplain may directly affect riparian vegetation and channel function during high flows. Often during high flow events, roads parallel to the stream channel within the floodplain will capture the flow and act as a secondary channel. Thus, rather than the floodplain functioning to reduce flow and deposit sediment, the road will transport the flow and erode the road into a stream channel.

In addition, erosion from roads and trails is dependent on soil type and slope. Due to the compacted nature of roads, most roads on steep slopes are susceptible to erosion by rilling and gullying where there is not enough rock to provide stability and roughness. However, even roads located on flat slopes with non-cohesive soils, such as sand, may erode into rills and gullies. Erosion of roads may affect upland vegetation and soil productivity where gullies drain the surrounding surface and subsurface water, and may

supply to stream channels sediment and road associated chemicals such as spills or oils generated on the road surface (Furniss *et al.*, 2000).

Analysis of the alternatives is based on the allocation of recreation motorized use by the following management areas: motorized use on designated roads only, motorized use on designated roads and trails, motorized use on existing roads and trails, open to motorized vehicles, and closed to motorized vehicles. For analysis purposes, it is assumed that areas closed to motorized use would have the least effect to hydrologic function, riparian vegetation, and water quality. The relative effects would increase with higher road and trail densities, which is assumed to increase in the following order: designated roads only, designated roads and trails, existing roads and trails, and open. For each management area the susceptibility to erosion and extension of the drainage network will be determined by the acres of area on slopes >15 percent, and the potential to directly impact riparian vegetation and stream and floodplain function will be determined by the number of miles of rivers and streams. This information will allow for a qualitative analysis of relative differences between alternatives.

Transportation and Access Management
For analysis purposes, the basic assumptions for Transportation and Access are considered similar to those for Recreation-Motorized Roads and Trails (see above).

Analysis of the alternatives will be based on the susceptibility to erosion and extension of the drainage network as determined by road miles/density of roads by road class (arterial, collector, local) on slopes >15 percent by watershed. Unlike Recreation-Motorized Roads and Trails, the location of the roads for Transportation and Access Management are known. This will allow for determination of relative differences in potential road closures and subsequent road miles that could potentially route water and their associated pollutants (sediment, oil, other chemicals, etc.) to stream channels. A reduction in road miles would potentially decrease the stream network extension by roads and decrease the hydrologic integration of roads and streams.

Analysis of the alternatives will also be based on the potential to directly impact riparian vegetation and stream and floodplain function as determined by the miles of road, by road class, that are located within 100 ft. of a perennial stream, or 50 ft. of an intermittent or ephemeral stream channel, by watershed. The 100 ft. and 50 ft. distances are chosen as representative values for RCAs and serve as surrogate RCA interim values, which are based on the floodprone width. This data would provide a rough estimate of the roads that are located within the floodplain and floodprone area and may be directly affecting floodplain function and riparian vegetation. Currently, data does not exist that would precisely locate where roads are impinging on floodplains and riparian areas. Therefore, the 50 ft. and 100 ft. buffer areas serve as surrogates for analysis purposes to determine direct effects on riparian areas and floodplains.

Bend-Redmond Highway 97 Allocation (excerpted from Bend-Redmond Water Quality Evaluation, 2003)
The Highway 97 project could affect water resources by construction activities, design and operation of the highway, and maintenance activities. Construction impacts result from ground disturbance exposing soil to wind and water erosion, and by spills of chemicals. Traffic and impervious surface area combine to produce polluted runoff, while the highway's alignment can disturb landscape elements that contribute to maintaining water quality. In addition a highway can disrupt both surface and subsurface hydrology. Maintenance activities may disturb the surface, apply chemicals, and deposit sediments on the roadway that can be washed into surface waters.

The effects of these activities depend primarily on the magnitude of the project, traffic volumes, location, vulnerable resources, and the implementation and effectiveness of mitigation measures.

Analysis of the alternatives is based on the potential to pollute surface waters based on surface water features in the project corridor; potential to pollute groundwater based on the expected pollutant load in highway runoff; and depth to groundwater aquifer.

Grazing Management

Grazing animals reduce water infiltration by removing protective plant material and compacting the soil surface by hoof action. In general, ungrazed lands have higher infiltration rates than those of grazed lands, moderate and light grazing intensities have similar infiltration rates, and heavy grazing causes definite reductions in infiltration rates over moderate and light grazing intensities (Holechek *et al.*, 1995). A decline in infiltration rates and increase in sediment production is significantly higher on moist soils as compared to dry (Warren *et al.*, 1986a; Warren *et al.*, 1986b). Heavy grazing accelerates erosion by reducing the mulch and plant cover that protects the soils and retards overland flow. Moderate to light grazing will not cause a statistically significant increase in erosion when good plant cover is developed and maintained. Increased erosion may result in sedimentation of streams and rivers. In addition to increased sediment delivery to streams, overland flow may transport animal wastes directly into stream channels, impairing water quality through bacterial contamination and increased nutrient levels (MacDonald *et al*,. 1991).

Current monitoring within the planning area indicates that most allotments receive light to moderate grazing utilization. Decisions made with this plan will not change grazing season-of-use or grazing intensity.

One common human activity that has been responsible for the degradation of riparian diversity throughout the western United States is improper domestic livestock grazing (Kauffman, 2000). Others confirm that improper livestock grazing, such as continuous or season-long use is most damaging to streamside areas and wetlands because livestock concentrate and linger on those areas due to the convenience of forage, water and cover (Gunderson, 1968; Evans and Krebs, 1977; Severson and Boldt, 1978; Knopf and Cannon, 1981). Effects from improper livestock management through excessive grazing and trampling include reduction or elimination of riparian vegetation which may cause channel aggradation or degradation, changing streambank and channel morphology, and a lowering of the surrounding water tables (Platts, 1986; Kovalchik and Elmore, 1991; Tucker and Leininger, 1990).

Historic grazing regimes have resulted in residual effects to stream channels within the planning area, and currently there are a few areas within the planning area where stream channel banks and riparian vegetation continue to be impacted by livestock grazing.

All allotments will be assessed for compliance with Standards and Guidelines to promote healthy sustainable rangeland ecosystems (USDI, 1997). The goal is to reduce overland flow and subsequent transport of pollutants to stream channels, and to maintain or improve water quality. Therefore, for all alternatives, all allotments within the planning area would be managed for properly functioning riparian and wetland areas, and protective vegetative cover to increase infiltration, reduce overland flow and erosion, and improve water quality. In addition, the BLM and FS will jointly complete Water Quality Restoration Plans to address water quality impaired streams listed as 303(d) (see Vegetation section above).

For each alternative, the potential for reduced infiltration of water will be determined by the number of acres within allotments to be grazed by livestock, and the number of acres within allotments closed to livestock grazing. The potential for livestock impacts in riparian areas will be determined by the number of miles of rivers and streams within allotments proposed to be closed to grazing. For analysis purposes, it is assumed that any grazing will allow for a higher potential for effects to occur to hydrologic function, riparian vegetation, and water quality. Thus, this information will not measure actual

acres or miles of streams and rivers that would definitely improve due to removal of livestock grazing. However, it will give a relative measure as to the ability for livestock to reduce infiltration and to utilize riparian areas, and the potential for surface runoff that contains elevated levels of sediment, bacteria, and nutrients to reach streams.

Incomplete and Unavailable Information

Data or models to predict the amount of sediment delivery to specific streams as a result of indirect effects of implementing the RMP are not currently available. Available computer models for assessing runoff and routing sediment are generally limited to small watershed applications and are not applicable to the sub-basin scale. Data on changes in vegetative cover following treatments within the planning area is known only in very site-specific instances. In addition, determining the actual location of roads and trails is not within the scope of this RMP, and the location and hydrologic disposition of each road segment (i.e. ditches draining to road-stream crossings, ditches draining to gullies, cross-drain spacing intervals, road drainage distance from streams) would be required to determine how effective roads are at transporting surface flow to stream channels. Data of this type will not be known until site-specific analysis. However, this type of data is not needed for this analysis to reasonably anticipate the potential for significant effects as a result of the allowable use and allocation decisions made with this plan. Instead, this analysis relies on accepted scientific relationships between watershed and riparian processes and functions, and the projected watershed and streamside conditions.

Analysis of the Alternatives

Common to All Alternatives

Direct and Indirect Effects

Recreation-Motorized Roads and Trail
With respect to potential direct effects from roads located within RCAs, all alternatives would maintain closures to motorized use within the Deschutes River and Crooked River canyon bottoms. The exception to this is along the Chimney Rock segment of the Lower Crooked Wild and Scenic River, where State Highway 27 and numerous BLM campgrounds are located within the RCA on the east side of the river. All other areas within the Chimney Rock segment would be closed to motorized use, particularly on the west side of the river.

Transportation and Access Management
Implementation of all alternatives (1-7) is identical with regard to effects within RCAs and streamside conditions. All alternatives would make available for closure 82 miles of roads within RCAs. Therefore, all alternatives would allow for improved riparian vegetation and stream channel function on more miles of stream compared to current conditions, by eliminating direct impact from compaction within the floodplain and disturbance of riparian vegetation.

Grazing Management
All alternatives would not allow livestock grazing within the Deschutes River and Crooked River canyons, including the Middle Deschutes and Lower Crooked Wild and Scenic Rivers (USDI *et al.,* 1992) (Table 4-5). Therefore, differences in effects focus on smaller perennial, intermittent, and ephemeral streams. In addition, all alternatives would allow livestock grazing within the Bear Creek watershed, which is on the 303(d) list for stream temperature. Therefore, there would remain potential for livestock to utilize riparian vegetation to the detriment of the channel. However, a riparian grazing system for over 20 years has transformed Bear Creek from a denuded gully into a recovering system that is currently in Proper Functioning Condition. While it is not at potential, the stream continues to move in the desired direction with reduced stream

Table 4-5: Number of Miles of Rivers and Streams in Allotments Proposed to be Closed to Grazing, or Closed or Within Reserve Forage Allotment (Close or RFA)

	Alternative							
	1	2	3	4	5	6	7*	
	close						close	Close or RFA
Miles of Perennial Rivers (Crooked and Deschutes)	11	11	11	11	11	11	11	0
Miles of Perennial/Intermittent/Ephemeral Streams	2	4	4	92	296	133	40	128

*Allotments in Close or RFA and are vacant are considered "closed" in this table.

width, increased depth, and overhanging sedges that provides shade. Upstream water withdrawals are potentially a major contributing factor for reduced summer stream flows and higher stream temperatures.

Other perennial streams that would remain open to livestock grazing with all alternatives include those located south of Prineville Reservoir, including Deer Creek and Sanford Creek These stream channels continue to have poor riparian vegetation and channel conditions mainly due to trespass livestock use and flashy streamflows during high intensity thunderstorms. These streams flow directly into the Prineville Reservoir and that section of the Crooked River that is on the 303(d) list for stream temperature and pH. High stream temperatures within Deer Creek and Sanford Creek are likely contributing some additional warm water to the reservoir and the Crooked River at low reservoir elevations. However, due to the small quantity of flow derived from Deer Creek and Sanford, they are likely insignificant contributors to the high stream temperatures in the listed segment of the Crooked River.

Alternative 1

Vegetation
This alternative would treat approximately 17,000 acres for improved infiltration, reduced runoff and erosion, and improved soil productivity.

Recreation-Motorized Roads and Trail
Based on the amount of area with slopes >15 percent , Alternative 1 would have the most effect to hydrologic function as compared with all other alternatives due to the amount of area where existing roads and trails would be available for use (22,275 acres), and the amount of area designated as open for use year-round (21,215 acres) (Table 4-6). These areas include Cline Buttes, Powell Buttes, Horse Ridge, West Butte, Prineville Reservoir area, Bear Creek, and canyons in the northwest part of the planning area. These areas open to motorized use and use on existing roads and trails contain hundreds of miles of streams, including Bear Creek, McKenzie Canyon, Deep Canyon, Squaw Creek, and the Crooked River (at low pool elevation in Prineville Reservoir) (Table 4-7). Therefore, Alternative 1 would result in the greatest potential for direct impacts to RCAs relative to the other alternatives by allowing motorized use off roads or trails within watersheds containing perennial, intermittent and ephemeral streams. Increased amounts of sediment and water would be routed into these stream channels, including Bear Creek, Squaw Creek, and the Crooked River, which are on the 303(d) list for stream temperature.

Table 4-6: Acres of Management Area for Roads and Trails on Slopes >15% by Travel Access Designation

Travel Access Designation	Alternative 1	2	3	4	5	6	7
Closed to Motorized Vehicles	3,433	7,233	10,705	9,065	15,582	19,017	22,874
Limited to Designated Roads and Trails	8,128	40,804	29,053	30,931	26,331	22,349	15,749
Limited to Designated Roads Only	20	17,475	25,753	25,515	23,599	24,144	28,183
Limited to Existing Roads and Trails	22,275	0	0	0	0	0	0
Open Year Round	21,215	0	0	0	0	0	0

Table 4-7: Number of Miles of Rivers and Streams by Motorized Travel Access Designation

Travel Access Designation	Alternative 1	2	3	4	5	6	7
Closed to Motorized Vehicles							
Perennial Rivers (Crooked and Deschutes)	27	27	27	27	27	27	27
Perennial/Intermittent/Ephemeral Streams	30	64	139	74	124	187	138
Limited to Designated Roads and Trails							
Perennial/Intermittent/Ephemeral Streams	207	746	487	508	530	460	367
Limited to Designated Roads Only							
Perennial/Intermittent/Ephemeral Streams	112	168	354	399	325	334	418
Limited to Existing Roads and Trails							
Perennial/Intermittent/Ephemeral Streams	330	0	0	0	0	0	0
Open Year Round							
Perennial/Intermittent/Ephemeral Streams	302	0	0	0	0	0	0

Therefore, water quality would be diminished in terms of sediment, but would likely not affect the parameter, temperature, for which the streams were listed. The areas with designated roads and trails would include the steeper slopes between West Butte and Horse Ridge. Horse Ridge would be designated road use only. These areas only contain intermittent and ephemeral stream channels that flow out into broad flats and would not likely contribute to water quality problems in perennial streams.

Transportation and Access Management
Alternative 1 would be able to affect hydrologic function and potential to extend the drainage network given the transportation network on slopes >15 percent (Table 4-8).

Grazing Management
Alternative 1 would have a moderate-high potential to affect watershed and hydrologic function. Most allotments would allow livestock grazing, which would allow for increased potential for grazing in RCAs that may not be consistent with RCA objectives

Table 4-8. Miles of BLM GTRN Roads on Slopes >15% by Road Class

Road Class	Alternative 1	2	3	4	5	6	7
Arterial	13	13	13	13	13	13	13
Collector	7	7	4	4	4	4	4
Local	30	30	33	33	33	33	33

and would have the least miles of streams (along with Alternatives 2 and 3) closed as compared to Alternatives 4 – 7.

Common to Alternatives 2-7

Vegetation

All action alternatives (Common to Alternatives 2-7) would make approximately 165,000 acres available for vegetative treatment that would occur within a portion of the High Priority Restoration Area in the vicinity of Prineville Reservoir, the Aquatic Stronghold Restoration Priority areas, and the sage grouse restoration area. Vegetation treatment with Common to Alternatives 2-7 would indirectly benefit approximately 680 miles of stream channels and riparian areas (Table 4-9). The treatments within a portion of the High Priority Restoration Area in the vicinity of Prineville Reservoir would potentially improve streamflows, reduce peak flows, and reduce juniper competition with riparian vegetation on 10 miles of perennial streams and 306 miles of intermittent/ephemeral streams, including Bear Creek, Sanford Creek, Deer Creek, Little Bear Creek, and Sage Hollow. Bear Creek is water quality limited for stream temperature. In the long-term reducing coniferous tree density within the RCAs that directly compete with riparian vegetation would improve stream shade as riparian vegetation amount and vigor is increased. As a consequence, stream temperature and bank and channel stability would be improved, thereby improving conditions for beneficial uses of irrigation, fish, and wildlife. Within the Aquatic Stronghold Restoration Priority areas, similar benefits to streamflow and riparian vegetation would potentially be realized on 20 miles of perennial streams and 62 miles of intermittent/ephemeral stream, including Crooked River below Bowman Dam, the Deschutes Wild and Scenic River from Big Falls to Lake Billy Chinook, and McKenzie Canyon.

Common to Alternatives 2-7 would be expected to increase in riparian vegetation resulting in subsequent improvement in stream channel condition, function, diversity,

Table 4-9: Number of Miles of Rivers and Streams within Vegetation Management Emphasis Areas

Stream Type	Alternative 1*	2	3	4	5	6	7
Perennial Rivers/Streams	5	37	30	37	37	30	30
Intermittent/Ephemeral Streams	75	657	730	657	657	730	730

*miles are estimated based on acres of treatment in Brothers-La Pine

water quality, and habitat for both aquatic and terrestrial species. Water quality for the Crooked River below Bowman Dam would not be improved as the water quality meets state standards except for dissolved gasses as a result of dam operations. Although the Deschutes River is listed as water quality limited for temperature and pH and is on the 303(d) list, water quality would not likely improve with implementation of any of the alternatives because of limitations due to upstream water diversions for irrigation purposes. (Additional information on this subject will be available in the Water Quality Restoration Plan). Objectives for vegetative treatments within these segments would be to improve the ecological and vegetative condition of the riparian areas. Although some encroachment by western juniper has occurred within the Deschutes River riparian area, it is not to the detriment of shade provided to the stream. Within the Sage Grouse Restoration Area, 280 miles of intermittent and ephemeral streams may attain reduced peak flows and longer residence time of water within the channels.

Recreation-Motorized Roads and Trail
All action alternatives (2-7) would potentially improve hydrologic function and result in fewer direct impacts to RCAs, riparian vegetation, and water quality relative to alternative 1, no action. This is due to all action alternatives having designated roads or roads and trails, and eliminating open areas. Therefore, since all action alternatives are an improvement to water resources and hydrologic function, the remaining effects discussion will focus on relative differences between the action alternatives.

Alternative 2

Recreation-Motorized Roads and Trail
Alternative 2 would disrupt hydrologic function less so than Alternative 1, but more so than Alternatives 3-7. This is due to most of the area being designated for "road and trail" use with 40,804 acres of area on slopes >15 percent that are designated for "roads and trails". As a result, Alternative 2 has the most miles of streams (740 miles) of all the alternatives within areas designated for motorized use on "roads and trails". Therefore, potential to route water and sediment to stream channels, possibly affecting riparian vegetation within RCAs, is highest relative to Alternatives 3-7. The main difference between Alternatives 3-7 and Alternative 2 is that Alternatives 3-7 would have more potential to maintain or improve conditions within perennial streams south of Prineville Reservoir, including Bear Creek, Sanford Creek and Deer Creek, due to motorized use on "designated roads only". Whereas, within this area south of the reservoir, Alternative 2 would allow motorized use on both designated roads and trails. Thus, potential exists with Alternative 2 for a higher road and trail density and more direct and indirect effects within the RCAs and stream channels than with Alternatives 3-7.

Streams that would potentially be affected with implementation of the roads and trails designation of Alternative 2 include McKenzie Canyon, Deep Canyon, and Tumalo Creek, which are tributaries to the Deschutes River, a 303(d) listed stream for stream temperature and pH. Other streams potentially affected include Sanford Creek, Deer Creek, Bear Creek, and Sage Hollow, all of which flow into Prineville Reservoir and the Crooked River, which is 303(d) listed for stream temperature and pH. Bear Creek is also on the 303(d) list for stream temperature. Long Slough, a tributary to the Little Deschutes (which is 303(d) listed for stream temperature and dissolved oxygen), would also be managed for motorized use on roads and trails. Water quality for all of these listed segments would not improve relative to Alternatives 3-7 with respect to sediment and possibly pH, but stream temperature would not likely be affected. However, while Alternative 2 would improve riparian vegetation and water quality less so than Alternatives 3-7, improvements to riparian vegetation in RCAs and subsequent water quality would likely occur with implementation of Alternative 2 relative to Alternative 1, which would have an "open" or "existing roads and trails" designation. Alternative 2 would maintain closures to motorized use in small, isolated blocks that would affect short segments of intermittent and ephemeral streams.

Transportation and Access Management
Alternative 2 would be able to affect hydrologic function and potential to extend the drainage network given the transportation network on slopes >15 percent (Table 4-8).

Grazing Management
Compared to the other alternatives, Alternative 2 would have a moderate-high potential to affect watershed and hydrologic function. Most allotments would allow livestock grazing, which would allow for increased potential for grazing in RCAs that may not be consistent with RCA objectives and would have the least miles of streams (along with Alternatives 1 and 3) closed as compared to Alternatives 4-7.

Alternative 3

Recreation-Motorized Roads and Trail
Alternative 3 would have less potential to affect hydrologic function compared with Alternatives 1, 2, and 4 because Alternative 3 has more area in the "closed" and "roads only" categories where slopes are greater than 15 percent. Alternative 3 would close the Cline Buttes and Tumalo area to motorized use. Potential for routing of sediment and water via the recreation road surfaces on Cline Buttes is the least with Alternative 3 since the whole Cline Buttes area is closed to motorized vehicles. Alternative 3 would maintain a closure to motorized vehicles in the Badlands, thereby closing the Dry River RCA to motorized use. Alternative 3 would allow use on designated roads and trails in the area north of Prineville Reservoir and in the Sage Hollow area, which is a tributary to Bear Creek Thus, with Alternative 3, there is potential for direct effects to intermittent and ephemeral streams north of Prineville Reservoir and in the Sage Hollow area. As stated above, Bear Creek and the Crooked River in Prineville Reservoir at low pool elevation are on the 303(d) list for stream temperature and pH (Crooked R. only). Motorized use on designated roads on Horse Ridge would potentially increase transport of sediment and water to the ephemeral channels in the Horse Ridge relative to Alternatives 5, 6, and 7, which close Horse Ridge to motorized use. However, effects would be limited to the ephemeral channels on Horse Ridge, and possibly Dry River, as these stream channels do not flow into any perennial streams. Alternative 3 would also close areas above the canyon rim along the Deschutes River. Although this section of the Deschutes River is listed for temperature and pH, Alternative 3 would potentially reduce the amount of sediment derived from roads and trails above the canyon rim.

Grazing Management
Compared to the other alternatives, Alternative 3 would have a moderate-high potential to affect watershed and hydrologic function. Most allotments would allow livestock grazing, which would allow for increased potential for grazing in RCAs that may not be consistent with RCA objectives and would have the least miles of streams (along with Alternatives 1 and 2) closed as compared to Alternatives 4-7.

Alternative 4

Recreation-Motorized Roads and Trail
Alternative 4 would have motorized use on "designated roads" along the Deschutes River rim near Cline Buttes, Tumalo area, east side of Bear Creek area, the Badlands, and Horse Ridge. The west side of Bear Creek would also have "designated roads and trails" with Alternative 4. This alternative would maintain more area in the "roads only" category than "closed" relative to Alternatives 3-7. Therefore, Alternative 4 has more potential to introduce sediment and directly impact RCAs and water quality in the Deschutes River, Bear Creek, and intermittent and ephemeral streams in the Badlands (Dry River), and Horse Ridge area as compared with Alternatives 3 and 7. However, the stream network in the Badlands and Horse Ridge area is entirely ephemeral in nature (including Dry River); and therefore, they flow only during times of intense summer

thunderstorms or snowmelt, and do not connect to any perennial streams. Areas closed to motorized use are limited to small, isolated blocks that would affect short segments of intermittent and ephemeral streams.

Grazing Management
Compared to the other alternatives, Alternative 4 would have a moderate potential to affect watershed and hydrologic function.

Alternative 4 would be better at maintaining or improving RCAs than Alternatives 1-3 by closing portions of the Deep Canyon and McKenzie Canyon areas to livestock grazing. McKenzie and Deep Canyon both flow into a segment of the Deschutes River that is on the 303(d) list for stream temperature and pH. While there is currently no information to indicate that McKenzie and Deep Canyons are contributing to the high stream temperatures, potential remains for livestock grazing to utilize riparian vegetation and reduce stream shade. However, McKenzie Canyon is a perennial stream only due to its use as an irrigation canal during the growing season, when water stored in a pond in its headwaters is released for irrigation purposes. As a consequence, McKenzie Canyon supports diverse and healthy riparian vegetation. The area adjacent to Cline Buttes and along the Deschutes River canyon rim would also be closed to livestock grazing with Alternative 4. Thus, there would be less potential for compaction and runoff of water, sediment, and nutrients into the Deschutes River, and Deep and McKenzie Canyons.

Alternative 5

Recreation-Motorized Roads and Trail
Alternative 5 would be less disruptive to hydrologic function than Alternatives 2, 3, and 4 due to more area on slopes >15 percent in the closed category, including Horse Ridge and Powell Buttes. However, the higher acreage figure shown as closed on slopes >15 percent in Alternative 5 as compared with Alternative 3 is due to the closed designation on Horse Ridge. As a result, there is less potential for extension of the drainage network by roads on Horse Ridge, and the intermittent and ephemeral channels would not have increased flows or be directly impacted by roads. Based on the number of miles of streams located within closed areas, the potential to directly affect RCAs and riparian vegetation is greater for Alternative 5 relative to Alternative 3. Most of these additional miles open to use on designated roads are located on Cline Buttes and in the Tumalo area. Alternative 5 would allow for motorized use on roads only in the Badlands, which is relatively flat terrain, and north of Prineville Reservoir. Therefore, there would be limited potential for roads to capture and transport water and sediment to stream channels as compared with a roads and trails designation. However, as indicated with Alternative 4, the streams in the Badlands area are all ephemeral in nature and do not connect to any perennial streams. The roads and trails category for a portion of the Bear Creek area and Sage Hollow would potentially introduce more sediment and increase water transport in Bear Creek relative to Alternative 7.

Grazing Management
Based on the total acres available to livestock grazing, Alternative 5 would have the least potential to affect watershed and hydrologic function.

Since Alternative 5 would have more area closed to livestock grazing, it is assumed there would be the least compaction and best infiltration of all alternatives. As a consequence, Alternative 5 would be the best at improving or maintaining water quality in perennial, intermittent and ephemeral streams by reducing the potential for compaction, reduced infiltration and overland flow. Streams within these closed areas include Deep and McKenzie Canyons, Squaw Creek, and the Little Deschutes River. Alternative 5 would result in fewer miles of RCAs grazed relative to all other alternatives by closing the most area and the most miles of intermittent and ephemeral streams to livestock grazing. Elimination of livestock use in these areas would reduce potential for livestock use on

riparian vegetation, thereby maintaining or improving stream shade, channel bank stability, and reducing potential for sedimentation and nutrient loading. Both Squaw Creek and the Little Deschutes River are listed for stream temperature. However, the amount of BLM managed lands immediately adjacent to these two waterbodies is very limited (Squaw Creek 0.5 miles; Little Deschutes 1.0 miles). Therefore, in other alternatives that are open to livestock grazing in these two areas (Alternatives 1-4 and 6), potential for direct effects to riparian vegetation and stream banks on Squaw Creek and the Little Deschutes River would be extremely minimal.

Alternative 6

Recreation-Motorized Roads and Trail
Implementation of Alternative 6 (and 7) would have the least potential effect within RCAs because they would maintain the most intermittent and ephemeral channels within zones closed to motorized use relative to all action alternatives. The streams located in closed areas to motorized use with Alternative 6 would include Dry River within the Badlands WSA, Smith Canyon, and other intermittent and ephemeral streams on Horse Ridge and within the Tumalo area. Alternative 7 would close the Badlands WSA, Tumalo area, and the rim along the Deschutes River near Cline Buttes to motorized use, but would allow motorized use on roads and trails in Smith Canyon. Both Alternative 6 and 7 would allow motorized use on roads and trails in Cline Buttes area, Deep Canyon and McKenzie Canyon watersheds. While both Alternative 6 and 7 would maintain roads only surrounding Prineville Reservoir and much of Bear Creek, Alternative 7 would extend the roads only designation to include all of Bear Creek and the Sage Hollow area, a tributary to Bear Creek. Therefore, most of the Bear Creek watershed would be subject to much reduced transport of sediment and water into Bear Creek, a 303(d) listed stream for temperature, with Alternative 7.

Grazing Management
Compared to the other alternatives, Alternative 6 would have a moderate potential to affect watershed and hydrologic function.

Alternative 6 would be similar to Alternative 4, but would better protect intermittent and ephemeral streams through closures in the La Pine area, but would not provide closures in the Deep Canyon and McKenzie Canyon area. Thus, although Table 4-5 indicates more miles or streams closed in Alternative 6, all of those miles closed would be intermittent or ephemeral streams, whereas Alternative 4 would close several miles of perennial stream on McKenzie and Deep Canyon, as stated above in the discussion of Alternative 4.

Alternative 7

Recreation-Motorized Roads and Trail
Implementation of Alternative 7 would have the least potential effect within RCAs because they would maintain the most intermittent and ephemeral channels within zones closed to motorized use relative to all action alternatives (see Alternative 6 description of effects).

Grazing Management
Compared to the other alternatives, Alternative 7 would have a moderate-low potential to affect watershed and hydrologic function.

Alternative 7 would also provide many miles of streams closed to livestock grazing or reduced grazing frequency (grazed one out of three years) and would be the next best alternative, compared with Alternative 5, for reducing potential for reduced infiltration and overland flow, and maintaining and protecting RCAs on perennial streams. Although the majority of the Squaw Creek area would remain open to livestock grazing,

the Deep Canyon and McKenzie Canyon areas, as well as the area directly adjacent to Squaw Creek (<0.5 mi of Squaw Creek) would be closed to livestock grazing or within the RFA. The Badlands, including Dry River, would be closed to grazing. Therefore, potential for livestock use on vegetation adjacent to Dry Cr, an intermittent/ephemeral channel, would be eliminated. In the long-term, a reduction in the frequency of grazing would minimize compaction and return infiltration to near non-grazing rates.

Alternatives 2, 4, and 5

In addition to those areas treated in all action alternatives, Alternatives 2, 4, and 5 would treat 5,800 more acres located within river canyon areas, for a total treatment area of approximately 170,800 acres. Compared with Alternative 1, which would treat approximately 17,000 acres, improved infiltration, reduced runoff and erosion and improved soil productivity would be attained in the long-term on 153,800 more acres with Alternatives 2, 4, and 5. Alternatives 2, 4 and 5 would also make available for treatment an additional 7 miles of river canyon areas, including several segments of the Deschutes River upstream of Lower Bridge, and the Crooked River in the vicinity of Smith Rocks State Park and within the Lower Crooked Wild and Scenic River downstream of the highway 97 bridge. Water quality would be maintained or improved on these river segments, which are all listed as water quality limited for temperature. Although vegetative treatments within these riparian areas would improve riparian vegetation and bank stability, these treatments would not likely improve stream temperatures. This is due to the reduction in streamflow within the Deschutes and Crooked Rivers as a result of upstream diversions for irrigation and is outside the control of the BLM. It is also likely that the listing for stream temperature of the Crooked Wild and Scenic River downstream of the Highway 97 bridge is not completely accurate, as that segment has a significant groundwater component and may meet state standards for a majority of that segment. Currently, sufficient water temperature data is not available to remove the Lower Crooked River from the 303(d) list.

Also with Alternatives 2, 4, and 5, approximately 7 miles of Deep Canyon would receive vegetative treatments to benefit riparian plant communities by reducing competition with juniper. In the long-term, stream shade would be improved in Deep Canyon as riparian vegetation amount and vigor is increased, which would ultimately lead to improved water quality. In total, implementation of Alternatives 2, 4, or 5 would treat 37 miles of perennial rivers and streams and 657 miles of intermittent and ephemeral streams for a total of 694 miles.

Alternatives 3, 6, and 7

Alternatives 3, 6, and 7 would treat approximately 180,000 acres of post-settlement juniper within the entire area identified as High Priority for Restoration, Aquatic Stronghold areas, and an expanded sage grouse treatment area. Compared with Alternative 1, which would treat approximately 17,000 acres, improved infiltration, reduced runoff and erosion and improved soil productivity would be attained in the long-term on 160,000 more acres with Alternatives 3, 6 or 7. Alternative 3, 6 and 7 would also treat a total of 760 miles of stream channels. In addition to those miles treated Alternatives 2-7, 80 more miles of intermittent and ephemeral channels located within the entire area mapped as High Priority for Restoration (including Dry River), and within the expanded sage grouse restoration area would benefit from reduced competition with juniper. However, while Alternatives 3, 6, and 7 treat a higher number of stream miles, While Alternatives 2, 4, and 5 propose to treat more miles of perennial streams and rivers, Alternatives 3, 6 and 7 treat more intermittent and ephemeral stream channels. These additional streams with Alternatives 3, 6 and 7, for the most part, flow out onto broad, flat expanses in the southern portion of the planning area, or may flow into Dry River, an intermittent stream that is a tributary to the Crooked River. Therefore, although there would be more miles of improved water quality with implementation of Alternatives 3, 6, and 7, it would likely not improve stream temperature or other water quality parameters in perennial streams.

Short-term (within 1-3 years), runoff and surface erosion would remain the same or possibly increase in treatment areas, particularly during intense storms, with implementation of all alternatives until which time vegetative cover returns in the form of forbs, grasses, shrubs, and litter. Due to the larger number of acres treated, Alternatives 3 and 6 would potentially produce the most surface erosion in the short term. Over the long term, following increased ground cover and reduced bare ground, it is estimated that overland flow and surface erosion will decrease as compared to current conditions.

Alternatives 3-7

Transportation and Access Management
Alternatives 3-7 would have the same effects, and slightly fewer impacts than Alternatives 1 and 2, due to few collectors located on slopes >15 percent. The reduction in collectors with Alternatives 3-7 would occur in the vicinity of Bear Creek Buttes and Sage Hollow, Horse Ridge, and north of Prineville Reservoir. This reduction in collectors translates directly to an increase in locals that would be available for closure. Thus, there would be less potential with Alternatives 3-7 to transport sediment and water from road surfaces to Sage Hollow, Bear Creek, and Prineville Reservoir if these locals were selected for closure in the future. Bear Creek and the Crooked River in Prineville Reservoir at low pool elevation are on the 303(d) list for stream temperature. If the local roads within Bear Creek and Prineville Reservoir area were closed, there would be potential to reduce sediment introduced into the stream channels, but may not assist in reducing stream temperatures.

Fire and Fuels Management

Assumptions

The question to be addressed in this analysis is "How can public lands be managed to minimize the risk of wildfire damage to nearby communities and valuable resources?" To answer this question, the following assumptions were made:

- Populations in Central Oregon will continue to expand at or near the current growth rates, filling in open spaces within existing communities and reaching out into current wildlands with new subdivisions and community centers.
- The concerns regarding fire movement across property lines goes both ways; from the federal lands to the private and from the private onto the federal.
- Wildland fire will not be eradicated in these ecosystems. A successful strategy will be built upon designing a vegetative environment, including species and structural characteristics that will produce desired, safely manageable fire behavior in the event of an unplanned ignition.
- There are no communities that are completely "fire safe." Certain combinations of ignition, fuel moisture in the live and dead vegetation, wind, and relative humidity can combine under extreme circumstances to threaten any community.
- A reasonable target is for fire behavior that will allow for firefighter safety and community protection given 90th percentile weather conditions.
- Weather conditions at the 90th percentile are defined as the combination of temperature, relative humidity, and wind speed on a summer day that is warmer, drier, and windier than 90 percent of all other recorded summer days. "Fire season" is defined as the 153 day period between May 1st and September 30th, during which most fires and acres burn. Under 90th percentile conditions, there will be about 15 days on average that are hotter, drier, and windier than those 90th percentile conditions.
- Public and firefighter safety is the top priority in fuels and fire management. Treatments in the wildland urban interface will focus on creating a safe working environment for fire suppression forces.

- Ground suppression forces can operate safely adjacent to flames that are 4 feet in length and less. Extreme fire behavior, including crown fire, rapid surface spread and long-range spotting, create an unsafe environment for firefighters and the public.
- Successful community protection strategies must include all of the players and partners within and adjacent to communities. Fuels treatments on federal lands alone will rarely improve the chances for safe and successful fire suppression if the homes to be protected are surrounded by fuel on the private property, and the structure itself is constructed of extremely flammable materials. The most effective strategy is to have a fire-safe structure, surrounded by vegetation on the private property that will burn with low intensities, surrounded by wildlands (regardless of ownership) that are managed for low intensity fire behavior.
- The area adjacent to homes and communities is valued for a variety of reasons, including wildlife habitat, unique vegetative communities, visual quality and recreational opportunities among others. Any management done in the name of hazardous fuels reduction in that zone must also consider the other objectives.

Wildland Fire Management
Protection of human life (firefighter and public safety) is the highest priority during a wildland fire, and will be recognized as the most important value under the selection of any alternative, including the No Action Alternative. Once firefighters have been assigned to a fire, their safety and that of the public is the highest value to be protected. Property and natural and cultural resources are lower priorities. Under any alternative, fire suppression activities will continue based on providing an appropriate management response to each incident.

The "Review Update of the 1995 Federal Wildland Fire Management Policy" acknowledges that fire is a critical natural process and must be reintroduced into the ecosystem on a landscape scale. Both the "Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin" (USDA-FS and USDI-BLM, 1996) and the "Review Update of the 1995 Federal Wildland Fire Management Policy and Program Review" recognize fire's essential role as an ecological process. This plan describes areas appropriate for the use of fire to meet management goals, and guidelines to direct its use. The plan will also discuss non-burning alternative treatments designed to reduce fire potential. Hazardous fuels reduction objectives may be met through a combination of fuels treatments, including thinning, mowing, pruning, piling, burning, grazing, or other approaches that reduce the three dimensional fuel profiles and reduce the risk of crown fire or uncontrollable surface fire.

With the protection of human life as the highest priority during a wildland fire, fuel conditions will be managed adjacent to communities at risk to allow for safe operations during fire suppression. All hazardous fuels management activities in the wildland urban interface (WUI) will take place following site-specific analysis. That analysis will consider the amount and arrangement of fuel that will contribute to wildland fire behavior under high and extreme summer weather conditions. Objectives for fuels management in the WUI will be linked to obtaining fire behavior that yields the desired results, including safety of the public and fire suppression forces.

Under any alternative, some level of burning will continue to occur annually in the planning area, including wildland fire incidents and prescribed fire activities at current levels under Alternative 1, and with greater annual burned acres under Alternatives 2-7.

Incomplete or Unavailable Information

Vegetation data, which is the basis of all fire and fuels predictions, was compiled for the plan area with an analysis of satellite imagery. The picture from space is divided into small, $1/6^{th}$ acre square pixels, and the dominant vegetation in each pixel estimated based on extrapolating from a number of sample data points. The data is suitable for

identifying broad trends and dominant vegetation patterns, but is less useful for making claims about the composition or density of species and fuels in the understory layers. Fuel models were estimated from this vegetative information, but may not be accurate at the individual project planning scale.

The mapping of the expanding wildland urban interface is an ongoing effort. Most neighborhoods and small clusters of homes are mapped, but with new construction and incomplete information at the time of the plan, the maps identifying the interface will continue to be refined.

Analysis of the Alternatives

Common to All Alternatives

Population growth is expected to continue in Central Oregon, expanding the geographic extent of the wildland urban interface area as new homes and neighborhoods push out into the former wildlands. At the same time, open spaces with communities fill in with new homes and businesses, slowly alleviating the risk of wildland fire within neighborhoods as the communities themselves become more urban. The vegetation, both living and dead, that fuels wildland fire will continue its cycle of birth, growth, reproduction, death and decay. In the dry Central Oregon climate, the growth and accumulation of biomass is more rapid than the decay potential in most areas, so in general fuels accumulate over time. The rangeland and woodland ecosystems tend to develop more total biomass over time, but fewer fine grasses and forbs that could carry fire, resulting in greater fire potential on the hottest, driest, windiest days and lesser potential for fire spread on average days. The landscape is prone to wildland fires in the summer months, when the combination of hot, dry weather, lightning, and human caused ignitions contribute to conditions perfect for burning.

Decisions made within the scope of this plan may directly or indirectly affect fuels and fire potential on lands managed by the BLM, including establishing allocations, objectives and guidelines for fire and fuels management. The effects described here are discussed in terms of potential for effects, because many of the potential activities described are likely to be implemented during the life of the plan but are not specifically analyzed or authorized with this RMP.

Indirect Fire Effects Common to All Alternatives

For the purposes of this plan, which is strategic rather than prescriptive, fire effects are indirect effects. All alternatives will have some fire effects, the difference being only in the amount of acres involved and the timing of the events. Fire effects include wildland fire; prescribed burning, including pile burning; or management of lightning fires for resource benefits. Those effects are:

- Potential conflicts with recreational users who may be displaced by emergency management vehicles;
- Potential conflicts with recreational users who may create trails or access areas that are closed to motorized use following vegetation treatments that reduce ground cover;
- Grazing permittees who are asked to rest the site before and after a prescribed burn;
- Air quality effects from burning;
- Changes to visual character of an area;
- Changes to wildlife habitat conditions for sage grouse and other species making their homes in the high desert shrub-steppe environment. Vegetation that is burned is often not used by wildlife immediately following the fire, but as the area recovers with a growth of grasses and forbs the following year, the fire area often becomes habitat for those species using early seral plant communities. Disturbance events like fire tend to add more edge habitat and vegetative diversity when the burn is a mosaic pattern, or the burned patch is in the hundreds to thousands of acres range. Extremely large fire events (tens to hundreds of thousands of acres) burning with high severity tend to reduce the overall vegetative diversity;

- Soils effects from burning, ranging from light burns that leave some of the organic material on site to severe burns that remove most of the organic matter, expose the soil surface to potential erosion from wind and precipitation. These effects are specific to the site, the properties of the soil, the amount, size, and arrangement of organic material before burning, and the amount of slope. In some cases fire frees nutrients and makes them available for uptake by plants, but very hot burns or pile burns that concentrate fuels could volatilize a majority of nitrogen directly beneath the fire;
- Potential invasion or spread of exotic species following the fire is a potential, especially where a seed source exists and the native vegetation is not vigorous.

Indirect Mechanical Fuels Treatment Effects Common to All Alternatives
All alternatives will have some mechanical fuels treatment effects, the difference being only in the amount of acres involved and the timing of the treatments. Mechanical fuels treatments effects include cutting, thinning, pruning, or brushing with chainsaws, mowers, or other mechanized equipment. Mechanical treatments may also be accomplished with grazing. Those effects are:

- Potential conflicts with recreational users who may be displaced or re-directed during operations,
- Potential conflicts with recreational users who may create trails or access areas that are closed to motorized use following vegetation treatments that reduce ground cover,
- Changes to visual character of an area, particularly if activities create linear visual features in visual resource management categories 1 and 2,
- Changes to wildlife habitat and availability. Fuels treatments may reduce hiding cover, interrupt connectivity corridors, and alter the kind and abundance of habitat available, which may benefit some species while disadvantaging others.
- Soil effects are possible with mechanized equipment that could cause compaction,
- Potential invasion or spread of exotic species following mechanized treatment is a potential, especially where a seed source exists already and the native vegetation is not vigorous.

Narrative description of the trends/effects
Approximately 74 percent of BLM managed lands within the UDRMP have missed 2 or more expected fire cycles. Changes to the native plant communities from past management choices such as fire suppression, road building, agricultural and urban conversion of wildlands, timber harvest, and grazing have contributed to the altered fire environment.

It is not desired, or possible, to restore every acre of federal land within the UDRMP. Many acres will be managed for those condition class 2 and 3 structures and fuel loadings to meet other resource objectives. Choices about how to prioritize restoration and maintenance projects involve opportunities to meet multiple objectives at the landscape scale, including reduction of risk at the WUI, sustainable habitats and watersheds, visual resources and recreational opportunity, and social and economic opportunities and constraints.

However, the most significant change in the natural fire environment has been the establishment and growth of the human populations within the plan area. The presence and continuous growth of human communities will limit the opportunity for fire use as a natural process to maintain wildland ecosystems into the foreseeable future. There is a great potential to approximate some the effects of wildland fire through the use of prescribed fire and mechanical fuels treatments.

The wildland urban interface zone currently occupies 212,500 acres of the plan area, and it is expected to continue its expansion. BLM manages about 39 percent of the WUI zone, with the remaining 61 percent in the hands of private owners. Those total acres considered to be within the WUI zone are likely to increase with new development.

All action alternatives in the UDRMP respond to National Fire Plan objectives to manage for wildland fuel conditions that contribute to fire safe communities with an aggressive hazardous fuels reduction program. Annual treatments in the wildland urban interface could total up to 12,000 acres. Given a large local and national commitment to the fuels program, the first entry for interface treatment will be executed within a five year period, with an annual WUI maintenance program following that could treat approximately 4,300 acres annually.

Alternative 1

Direct Effects
Few if any direct effects on the vegetation or fuels will result from implementation of Alternative 1, which would be a continuation of current direction.

Indirect Effects
Alternative 1 continues the use of the categories for values at risk classes within the plan area. The Brothers/La Pine planning area was evaluated for potential damage to resource values by fire. The values at risk classes for the planning area and range from the lowest values at risk (Class 1) to the highest values at risk (Class 6, special consideration values at risk). Values at risk are the basis for determining fire suppression action.

Low-Moderate Risk Classes
Allow for prescribed fire use to manage vegetation and habitat in low-moderate risk classes (1-3). The Interim Management Policy and Guidelines for Lands under Wilderness Review provides suppression guidelines for Wilderness Study Areas in the Planning Area (H – 8550-1, 7/5/95).

- Depending on circumstances, areas in fire risk classes 1-3 may be suitable for management of unplanned ignitions for resource benefit, as long as the fire behavior falls within the prescribed conditions to meet resource objectives, the fire is caused by lightning, and a risk assessment has been conducted prior to ignition that identifies the maximum manageable area, prescription parameters, mitigation measures for resources at risk, and criteria for determining when to suppress the fires.
- Prescribed fire would be carried out in accordance with approved fire management plans and appropriate smoke management and visibility goals and objectives.

Moderate-High Risk Classes

- Unplanned ignitions in this risk class (4 – 6) would be aggressively suppressed.
- Rural or urban areas between high value public lands, particularly La Pine, Bend, Redmond, and Prineville areas, would be managed as top suppression areas. The interface areas are of special concern because of housing developments and adjacent high resource values.
- A timely post-burn review and evaluation would be provided in order to define any rehabilitation needs.

Bear Creek Watershed

- Unplanned ignitions would burn under prescribed conditions, as long as District suppression forces are available to monitor and implement control actions as needed.
- Range developments would be protected.
- A maximum of four fires greater than 150 acres in size would be allowed to burn under prescribed conditions at any time.

Cumulative Effects
There is an emphasis from the National Fire Plan on hazardous fuels reduction for wildland urban interface areas and municipal watersheds across all federal land management agencies, and with the State and local fire protection partners. The Deschutes and Ochoco National Forests will be increasing the acres treated in their own hazardous fuels reduction and restoration of fire-adapted ecosystem projects,

including prescribed fire use and mechanical fuels treatments. This will result in a potential cumulative effect on wildlife habitat quality and distribution, including possible degraded habitat opportunities in the short term, followed by improved conditions across the landscape in the long term. Visual effects and changes to the landscape appearance at the broad scale may be a cumulative effect. These projects may change or limit the recreational opportunities in the short term during project operations. Opportunities for new user-created trails or illegal dumping may be more plentiful across the landscape. Ecosystems will tend to be more resilient to large scale disturbances from fire, with more opportunities to limit wildland fire growth using in treated areas as control lines. Smoke production during prescribed burning will increase, but there is a potential then for a decrease in smoke from wildland fires over time. Treatment of fuels will create job opportunities in the contract community. Commercial biomass availability may be a by product of fuels treatment in some areas.

Conclusions
Fuel treatment activities often have a short-term effect on recreation opportunities, visual and air quality, and a long-term effect of improved vegetative vigor, a more fire safe landscape, and more fire-safe communities. Introduction of exotic species will be a concern given any vegetative treatment, especially those areas with a seed source already available.

Common to Alternatives 2- 7

For the purposes of this plan, which is strategic rather than prescriptive, fuels treatment effects are indirect effects. No direct effects are evaluated here. The values at risk classes as described in Alternative 1, Brothers/La Pine RMP, are not being changed in Alternatives 2-7, with the exception of the creation of a new wildland urban interface special management zone that will replace portions of the areas previously mapped as Classes 4 to 6.

Indirect Effects

Annual WUI Acres Treated
Hazardous fuel reduction in the wildland urban interface is a high priority. Due to the number of acres involved, not all acres can be accomplished in one year. While the ability to complete the analysis and implementation depends heavily upon the budget, based on fuels treatment dollar availability in the past three years we will assume that in the WUI hazardous fuels dollars are not limiting and the only constraint is in the ability to plan and implement given scarce contracting and planning resources. The most ambitious program would accomplish the first entry of all acres within a five-year period. Acres that are currently functioning well would need a maintenance treatment once every 10 to 15 years in forested ecosystems, and annual mowing or grazing to maintain light fuels at the interface in rangeland systems. Table 4-10 displays the maximum projected annual treatment acres in the WUI. Actual annual treatments are expected to be smaller than the 12,650 acres described below due to budget limitations.

The size of the WUI varies with vegetative type, based on potential fire behavior. Forest fuels are heavy and can support extreme fire behavior, with crown fire and long range spotting contributing to safety concerns and resistance to control. In these areas, including lands in the La Pine area and ponderosa pine stands near Tumalo and Sisters, the WUI zone is 1.5 miles from the mapped communities at risk as published in the 2001 Federal Register. For communities surrounded by rangelands and woodland vegetation types with lighter fuel loadings, that area is described as ½ mile. These zones are considered to be the starting point in which to discuss and analyze hazardous fuels that may threaten firefighters or the public in the event of an unplanned ignition. Actual treatment areas may be narrower or wider than that, depending upon site-specific objectives and conditions of fuels and topography that are adjacent to communities.

Table 4-10. Wildland Urban Interface, potential annual treatments. Common to Alts 2-7.

WUI Acres by type	Total ac	BLM ownership (percent of total)	BLM ac to treat total	BLM Annual treatment ac	Types of treatment activities
Forest, 1.5 mile zone, first entry	76,005	44,701 (58 percent)	30,000 ac (~2/3 of BLM forestland WUI)	6,000 ac	Thinning, piling, and pile burning, pruning, mowing, grazing
Forest, 1.5 mile zone, maintenance entry			44, 700 ac, (maintenance entry every 15 years)	2,980 ac	Mowing, grazing, hand cutting of shrubs and seedlings to prevent ladder fuel development
Range 0.5 mile zone, first entry	136,502	39,207 (34 percent)	11,700 ac (assumes that only 1/3 of BLM rangeland WUI needs restoration entry)	2,340 ac	Mowing, grazing, hand cutting of shrubs, piling and pile burning
Range 0.5 mile zone maintenance entry			39,200 ac	1,320 ac	Mowing, grazing, hand cutting of shrubs, within 200 feet of property line, treat every two years
Totals	**208,657**	**79,963 (38 percent)**	**41,700 first entry**	**12,650 ac (8,340 first entry 4,300 maint. entry)**	**Total potential annual treatments in the WU: 12,650 acres**

Non-WUI Restoration Ecosystem and Fuels Treatments

Current condition classes are a qualitative measure describing the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components, species composition, structural stage, stand age, canopy closure, and fuel loadings. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species, introduced insects or disease, or other management activities. An area in condition class 1 is functioning as expected, with a low probability of losing key ecosystem components in the event of a wildland fire. Condition class 2 areas have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Areas designated condition Class 3 have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range. Fuels treatments in non-WUI areas will be designed to restore acres currently in condition classes 2 and 3 where the probability of success is high and other resource objectives can be met. Fuel treatments, mostly in the form of prescribed burning, will be done in condition class 1 areas to maintain desired conditions and prevent these areas from progressing into class 2.

Table 4-11. Condition classes in UDRMP area, acres by ownership.

Condition Classes	BLM	Other	Private	Total
1	103,725	1,411	71,625	176,761
2	294,037	7,792	279,874	581,703
3	279	6	1,249	1,534
Total	398,041	9,209	352,749	759,999

Cumulative Effects
Same as "common to all" cumulative effects discussion.

Conclusions
The wildland urban interface zone currently occupies 212,500 acres of the plan area, and it is expected to continue its expansion. BLM manages about 39 percent of the WUI zone, with the remaining 61 percent in the hands of private owners.

All action alternatives in the UDRMP respond to National Fire Plan objectives to manage for wildland fuel conditions that contribute to fire safe communities with an aggressive hazardous fuels reduction program. Annual treatments in the wildland urban interface could be as much as 12,650 acres. Given a large commitment to the fuels program, the first entry could be accomplished within a five year period, with an annual WUI maintenance program following that could treat approximately 4,300 acres annually. These treatments would greatly improve the ability of fire suppression forces to safely manage wildland fire adjacent to communities in the plan area, although there will be effects to air quality, wildlife habitat availability, visual quality, and recreational opportunities. The WUI fuels treatments will create jobs in the contracting community, increasing income potential for the local economy.

Visual Resources
Visual resources are an important consideration in the plan area. Opportunities for conflict exist where the wildland urban interface overlaps a VRM category 1 or 2 area. Where that occurs, fuels management reduction projects will be designed to meet VRM objectives for that category as defined below in Table 4-12.

WUI fuel treatments and potential social conflicts
Where WUI intersects other specially designated areas, WSA, wild and scenic river corridors, ACECs, or RNA's, the fuels objectives will be pursued within the framework of the objective for the special management designation.

Reduction of hazardous fuels in the WUI may increase conflicts between recreational users and adjacent landowners, increase incidents of unauthorized use, and could potentially impact visual quality, wildlife habitats, populations of rare plant species, spread of exotic species, or availability of forage or small wood products to the public. To better manage public use of BLM land, and to reduce the potential adverse impacts of fuels treatments to adjacent landowners, site-specific analysis should include mitigating measures in the project design. Those measures may include:

- Educational approaches, including posting of signs and working with the adjacent homeowners to enlist their support for appropriate use of BLM land;
- Physical barriers left or installed as part of the fuels treatment, including boulder placement, log barriers, fences, and vegetative patches or strips left in deliberate patterns to discourage unauthorized use;

Table 4-12: VRM Category/Acres within WUI Zone

VRM Category	Acres of Each Category in the UDRMP WUI Zone	Percent of BLM WUI acres
Private Ownership	441	
Unassigned Acres	3,247	
Class 1 – Natural ecological changes and very limited management activity are allowed. Any contrast created within the characteristic landscape must not attract attention.	1,717	1.97 %
Class 2 – Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape. Contrasts are seen, but must not attract attention.	6,580	7.56 %
Class 3 – Contrasts to the basic elements caused by a management activity are evident, but should remain subordinate to the existing landscape.	9,019	10.37 %
Class 4 – Any contrast attracts attention and is a dominant feature of the landscape in terms of scale, but it should repeat the form, line, color, and texture of the characteristic landscape.	67,230	77.28 %
Class 5 – The classification is applied to areas where the natural character of the landscape has been disturbed to a point where rehabilitation is needed to bring it up to one of the four other classifications. The classification also applies to areas where there is potential to increase the landscape's visual quality. It would, for example, be applied to areas where unacceptable cultural modification has lowered scenic quality; it is often used as an interim classification until objectives of another class can be reached.	0	0.00 %
Total	88,234	

- Design features should be employed to reduce the potential indirect effects of the fuels treatment on designated trails. It may be appropriate to move or close designated trails or roads within the WUI zone to reduce conflicts between users and adjacent landowners;
- Where backyard stewardship contracts are forged to treat the hazardous fuels at the WUI, consider including an agreement with adjacent landowner/stewards to refrain from accessing their private lands or other BLM land through the treated area.

The effectiveness of the measures described above is unknown. There are examples of success using these approaches to minimize conflicts in the past. Table 4-13 below displays the acres in the Wildland Urban Interface with limited travel designations. The greatest potential for conflict comes from those acres that are closed year-round. WUI fuels treatments that open up access opportunities will use the guidelines for project design to limit the conflicts in those areas.

Table 4-13: Travel Management Designations (acres) within WUI by Alternative.

Limited Travel Designation	Alternative 1	2	3	4	5	6	7
Private	3,653	3,651	3,651	3,651	3,651	3,651	3,656
Closed Year-round		6,190	11,878	7,247	10,579	10,958	15,445
Closed at specific snow depth	1,173		1,883				
Closed to motorized use	1,760						
Designated roads only year-round	4,221	15,354	44,648	12,200	14,730	17,630	14,170
Existing roads and trails seasonally *	2,942	7,210	6,056	7,335	7,491	34,624	31,543
Existing roads and trails year-round*	7,764	54,440	16,707	54,603	50,551	17,844	20,971
Open Year-round	65,485						
Designated roads seasonally		157	157				
Limited to type of vehicle			2,022	1,965		2,294	2,022
TOTAL**	**86,998**	**87,002**	**87,002**	**87,001**	**87,002**	**87,001**	**87,807**

Alternatives 2, 4, and 5

Annual Treatment Acres by Alternative: Alternatives 2, 4, and 5	Year 1-5	Year 6-15
Total Mechanical	11,385	5,253
Total Prescribed Fire	1,265	5,253
Total Treatment	12,650	10,506

Alternatives 3, 6, and 7

Annual Treatment Acres by Alternative: Alternatives 3, 6, and 7	Year 1-5	Year 6-15
Total Mechanical	11,512	6,140
Total Prescribed Fire	3,838	9,210
Total Treatment	15,350	15,350

Air Quality

Summary

Air Quality in Central Oregon is impacted by actions taken on federal lands such as burning and road building. The quality of the air is also sensitive to non-federal emissions, including but not limited to smoke from field burning, automotive exhaust, dust raised during farming, mining and road construction, or loose soil that is lifted by the winds from the wildlands. Wildland fire on any ownership is often the cause of poor air quality for a limited time during the event. This plan will only address decisions taken on BLM lands that may impact air quality within the airshed. It will not discuss or change the potential of any emissions outside of the plan area.

Assumptions

For the purposes of this analysis, the following assumptions were made:

Sources of air pollutants are smoke from wildland fire and prescribed burning, herbicide applications, and dust from use of unsurfaced roads as well as road construction activities.

Dust from road construction and maintenance primarily settles within a short time period, and stays relatively close to the point of origin. Localized effects from road dust would be noticed by residents within the planning area. The normal adverse effects from these actions would exist in all alternatives. The effects would be local, occurring mainly during the summer months when dust is produced from both public and administrative use of unpaved roads.

Wildland fires from within the plan area and also upwind sources on other ownership will continue to contribute sporadic smoke impacts in the summer months. While most of the smoke impacts to the area come from wildland fires to the west on the Deschutes National Forest, the plan area averages about 37 fires per year, most of them less than one acre in size.

While other sources of emissions are certainly locally important (road construction, maintenance and use, mining, farming, etc.), prescribed burning is the only resource management activity proposed under any alternative that could have a regional or airshed adverse effects on air quality. Smoke emissions from prescribed burning will generally dissipate to the east of the plan area, in the direction of the most common winds. Forested ecosystems that contain more overall biomass will yield more smoke than the more lightly vegetated rangelands and shrub steppe ecosystems. Smoke management strategies are becoming more and more complex as fire is used more frequently to preserve, restore or maintain forest and rangeland health and reduce hazardous fuels – primarily in the urban interface.

Smoke from prescribed burning competes with smoke from agricultural burning, residential wood consumption, and smoke from neighboring agencies. All smoke emissions are coordinated through the Oregon Department of Forestry under the Oregon Smoke Management Plan. BLM is currently a voluntary participant with the SMP on rangeland burning, while participation is mandatory for any emissions from forest land burning.

Incomplete or Unavailable Information

This plan is strategic rather than specific, and therefore, the total annual emissions from burning of piles, underburning, and broadcast application of fire are not known. Assumptions can be made based on objectives and the type of ecosystems in question. The amount of airborne dust that is generated from wind over the wildlands, mining activities, road construction and use, and farming is not known and cannot be quantified. Actions specifically permitted by BLM, such as mining and road construction, will have dust abatement mitigations as standard requirements.

Analysis of the Alternatives

Common to All Alternatives
Ambient air quality in the urban interface area is predominately rated as good. Air quality in the Bend area was a growing concern in the 1980's when inefficient wood stoves were a prominent source of heat for many residents. Despite rapid growth in the urban areas, air quality is improving. Airborne particulates and carbon monoxide levels are on a steady declining trend. Many older wood stoves have been phased out, and most new homes being built are relying on cleaner natural gas as a heat source rather

than wood. Newer automobiles with emission reduction features also contribute to better air quality in general. The fall and winter months are most prone to inversions, where stable, cooler air becomes trapped beneath a layer of warmer air aloft, and air quality in the populated areas can be impacted by land management activities such as pile burning or dust generated by heavy equipment on dirt roads.

Alternative 1
Alternative 1 will continue the current actions and programs in the plan area. Effects to air quality, including visibility and human health, will be consistent with current programs and policies.

Direct Effects
Any burning, road construction or other activity likely to result in emissions that may be an air quality issue will only be undertaken following site-specific analysis. There are no direct effects related to this alternative.

Indirect Effects
As mentioned in the B/LP RMP (page 121), air quality will be managed by holding surface disturbance at all projects sites at a minimum. Disturbed soil will be rehabilitated to blend into the surrounding soil surface and reseeded as necessary with a mixture of grasses, forbs and browse as applicable to replace ground cover and reduce soil loss from wind and water erosion. Pile burning in the spring and fall or broadcast burning in the rangeland and shrub steppe in late summer will continue at current levels, which total between 1,000 and 5,000 acres annually, with most of the smoke generated dissipating to the sparsely populated areas east of the planning area.

Cumulative Effects
Wildland fires in the region will continue to contribute particulate matter to the airshed periodically. Increasing populations and increasing recreational visits will increase the probability for airborne dust related to travel on dirt and gravel surfaced roads. The Deschutes and Ochoco National Forests, west and northeast of the planning area, are increasing the annual acres burned in response to the National Fire Plan.

Common to Alternatives 2-7
All action alternatives will treat the hazardous fuels in the wildland urban interface in order to support fire safe communities. All burning activities will comply with the Oregon State Smoke Management Plan, which ensures that the provisions of the Clean Air Act including meeting or exceeding the National Ambient Air Quality Standards (NAAQS). Burning activities away from the WUI differ by alternative.

Indirect Effects
Burning will be done in both the WUI, which will be mostly pile burning during inclement weather, and in the uplands away from the populated areas for ecosystem management objectives. The WUI program is common to Alternatives 2-7. The annual acres treated in the next ten year period could be as much as 12,650 acres, including maintenance treatments and first entry restoration efforts. Some of those acres will contain piles that will be burned, but in the rangeland and shrub steppe vegetation those piles will be quite sparse due to the light fuel loading currently in that vegetative type. The majority of rangeland and shrub steppe treatments would be accomplished using mowing, grazing, and hand cutting directly adjacent to the property line.

While the preferred deposition of hazardous fuels is use as a commercial product or biomass energy source, burning will be done where those options are not feasible due to access or economic factors. Areas near La Pine, in the conifer forest environments are more likely to contain piles for burning than rangeland ecosystems. Piles will be burned in the spring or fall some precipitation has been received to limit the potential for fire spread, but while the larger material in the piles are still dry enough to burn. Dry fuels

burn cleaner and hotter than wetter fuels; therefore, less smoke is produced. All burning will be done under desirable weather conditions to meet objectives for risk reduction and fuel consumption, and to minimize smoke impacts to the populated areas and protect visibility in Class 1 areas. Despite mitigation measures to reduce impacts, smoke will still be visible, and may cause a temporary localized conflict with residents, recreational users, and other visitors.

Cumulative Effects
Same as Alternative 1, except that the fuel treatments implemented under the plan are expected to eventually reduce the total volume of summer wildland fire emissions as fuel breaks become more common and the probability of stopping fires increases.

Effectiveness of mitigation measures
Mitigation measures to reduce smoke emissions while burning wildland fuels include reducing the amount of overall biomass for burning by removing it from the site, burning under dry fuels conditions, burning when the weather is predicted to carry smoke up and away from populated areas, or burning during or just before the onset of inclement weather. These measures are all proven to be extremely successful, but not guaranteed. Strategies based on our ability to forecast weather events are limited by the success of the forecast.

Alternatives 2, 4 and 5
Alternatives 2, 4 and 5 all propose to burn approximately 1,100 acres per year in years 1 through 5, and 5,200 acres annually in years 6 through 15. This creates a greater potential for emissions than Alternative 1, and a lesser potential than Alternatives 3, 6 and 7.

Indirect Effects
Burning projects will be implemented away from the wildland urban interface on projects that support ecosystem function or restore wildlife habitat. Air quality impacts from such projects are expected to be minor, as most of these activities will take place to the east of populated areas and will be executed under conditions that will carry smoke eastward as well. Rangeland fires are typically hot, rapid events in which most of the consumption and smoke production occurs with the passage of the flaming front, and very little smoldering occurs after the fire due to the lack of duff and large fuels in that vegetative type. All projects will comply with Oregon Smoke Management Plan, the Clean Air Act, and meet or exceed standards for NAAQS.

Alternatives 3, 6 and 7
Alternatives 3, 6 and 7 all propose to burn approximately 3,800 acres per year in years 1 through 5, and 9,200 acres annually in years 6 through 15. This is a greater potential for emissions than Alternatives 1, 2, 4 and 5.

Indirect Effects
Same as Alternatives 2, 4 and 5, but more acres will be involved. All projects will comply with Oregon Smoke Management Plan, the Clean Air Act, and meet or exceed standards for NAAQS.

Special Management Areas

Summary

Special management areas within the areas covered in the Upper Deschutes Resource Management Plan include Wilderness Study Areas, Wild and Scenic Rivers, Areas of Critical Environmental Concern, Research Natural Areas, and Caves. Each of these areas has special management direction covered in this RMP or in Planning Documents prepared since the adoption of the B/LP RMP.

Wilderness Study Areas (WSAs)
No changes in designation under any of the alternatives. See Recreation effects Alternatives 2-7 for effects of changes in management of Badlands WSA for travel management on inventoried route system and other recreation uses.

Wild and Scenic Rivers (W&SRs)
No changes in designation or management under any of the alternatives. Segments of the Deschutes and Crooked Wild and Scenic Rivers located within the planning area are covered under existing W&SR management plans.

Areas of Critical Environmental Concern (ACECs)
The B/LP RMP did not provide specific management direction for all aspects of each existing ACEC. New or changed management direction is listed below for existing ACECs. For a more complete description of effects of ACEC management guidelines (i.e. access and VRM classifications), see other relevant sections in this chapter , such as Recreation, Visual Resource Management, Vegetation, Wildlife, and Cultural Resources. The following, Table 4-14, is a summary of existing and proposed ACECs by alternative.

The Juniper Woodlands ACEC would specifically target old-growth values for protection. However, other alternatives that would designate new ACECs or retain existing ACECs or WSAs primarily for other values would also help protect old-growth woodlands where they exist. Each existing and proposed ACEC has a set of management guidelines for allowed uses that is generally more restrictive than those for areas outside of ACECs. Each alternative designates various combinations and sizes of ACECs (see Map 7 for ACECs, Map 4, Vegetation Types, and Table 4-14 above for comparisons).

Table 4-14: ACEC Alternative Summary Table

Existing ACECs	1	2	3	4	5	6	7
Badlands	16,684	16,684	16,684	16,684	16,684	16,684	16,684
Horse Ridge (RNA)	609	609	609	609	609	609	609
Lower Crooked River	2,592	0	0	0	0	0	0
Peck's Milkvetch	4,073	4,073	4,073	4,073	11,144	11,144	10,325
Powell Butte RNA	510	510	510	510	510	510	510
Wagon Road	75	See Wagon Roads below					
Proposed ACECs							
Alfalfa Market Road	0	0	4,200	4,200	0	0	0
Wagon Roads	0	875	875	875	875	875	875
Juniper Woodland	0	0	31,011	6,756	0	0	0
Sage Grouse	0	0	0	16,257	0	0	0
Smith Rock	0	0	2,119	0	0		0
Tumalo Canal	0	1,050	0	0	1,050	1,050	1,050
Total Acres by Alternative	**25,543**	**23,801**	**60,081**	**49,964**	**30,872**	**32,991**	**30,053**

Most of the proposed and existing Special Management Areas within the planning area contain some amount of old-growth juniper as follows (all acreages are estimates):

Badlands WSA (existing): 25,700 acres
Peck's Milkvetch ACEC (existing): 1,200 acres
Expanded Peck's Milkvetch ACEC (Alternatives 5 and 6): 7,200 acres
Expanded Peck's Milkvetch ACEC (Alternative 7): 7,000 acres
Horse Ridge ACEC/RNA (existing): 300 acres
Powell Butte ACEC/RNA (existing): 10 acres
Smith Rock ACEC (Alternatives 3 and 6): 150 acres

The total acreage of old-growth woodlands within existing and proposed Special Management Areas (other than the Juniper Woodlands and Alfalfa Market Road ACECs) ranges from 27,210 acres in Alternative 1 (existing) to 34,560 acres in Alternative 6. Old-growth in these areas would receive some of the benefits of resource protection for other highlighted ACEC values; therefore, effects on woodlands would also be reduced in these areas.

In addition, new proposed guidelines for access, designated roads and trails, VRM Classifications, and vegetation restoration would all provide protection for old-growth juniper woodlands where those new guidelines are applied within its range (see Maps 15-21, Recreation Emphasis and Map 22, VRM Class). With implementation of these new guidelines and designation of new ACECs, a substantial amount of the old-growth woodlands would receive an elevated level of protection over non-designated areas.

Existing management (Alternative 1) has allowed degradation of old-growth woodland communities and direct cutting or clearing of old trees throughout its range (see Affected Environment and Vegetation effects). Authorized activities and management that would have potential effects have been suspended or reduced pending completion of a new RMP. Illegal activities continue and are expected to continue at some undetermined level even after adoption of a new RMP. Increased public education and interpretation, signing, designated road and trail systems, and additional law enforcement may reduce effects on old woodlands, however, local populations and public uses are currently increasing faster than management capability at current funding levels.

Research Natural Areas (RNAs)
No changes in designation or management under any of the alternatives.

Caves
Caves nominated for significance or determined significant would be managed with an emphasis on education, research, and protection of cave resources. No activities would be allowed that would impair the nominated values for which the cave was determined significant. See Recreation, Wildlife, and Cultural Resources effects sections for effects of changes in activities allowed in caves.

Analysis of the Alternatives

Common to All Alternatives

Areas of Critical Environmental Concern

Badlands ACEC
The majority of management guidelines for this ACEC are a part of the Wilderness Study Area, which applies greater protection. The travel management of the area would be limited to designated routes and access points. The existing Interim Management Plan for Lands Under Wilderness Review provides additional travel management limitations to protect the area's resource values. If the Badlands WSA is not designated as Wilderness,

then the ACEC designation would be retained and protection of ACEC values would continue as modified by alternatives.

Horse Ridge ACEC/RNA
In Common to All Alternatives, the Horse Ridge ACEC/RNA would remain the same as identified in the B/LP RMP. Visual management is identified as VRM Class 1, allowing only changes that mimic the natural landscape. No Special Recreation Permits would be issued. The area would be managed under the Interim Management Policy for Lands under Wilderness Review.

Powell Buttes ACEC/RNA
In Common to All Alternatives, the Powell Buttes ACEC/RNA would retain the same boundaries and size as identified in the B/LP RMP. Visual management is identified as VRM Class 2.

Wagon Roads ACEC
Under all alternatives, the ACEC designation for the portion of Wagon Roads in Township 17, Range 12, and Section 1 would continue.

Caves
All alternatives would continue emphasis on review and determination for significance of all caves nominated for significance under the FCRPA. Caves would be managed consistent with the FCRPA and existing BLM policy. There would be a seasonal closure (hibernacula) for bats at Pictograph Cave.

Alternative 1

Areas of Critical Environmental Concern

Horse Ridge ACEC/RNA
As identified in the B/LP RMP, this area would remain Open to mechanized use.

Powell Buttes ACEC/RNA
As described in the B/LP RMP, Alternative 1 would limit motorized travel to existing roads and trails in the Powell Butte RNA. No Special Recreation Permits would be issued.

Peck's Milkvetch ACEC
Alternative 1 would maintain the existing Peck's Milkvetch ACEC at 4,073 acres. Peck's milkvetch is identified as a BLM Special Status Species and a State listed Threatened species. As such, it is subject to the protection and conservation policies of both governmental entities. The world-wide known range of this plant is limited to only central and south-Central Oregon. The existing Peck's milkvetch ACEC and proposed expansion of this ACEC encompasses the core habitat of this species. Alternative 1 would be less successful in protecting the plant because there could be more potential ground-disturbing activities allowed within Peck's milkvetch habitat occurring outside the existing ACEC.

Wagon Roads ACEC
In Alternative 1, approximately 150 acres of the historic Huntington Road would continue to be recognized as the Wagon Roads ACEC. Effects to the ACEC would be subject to the management guidelines found in the Brothers/La Pine RMP. The area is designated Open to motorized travel.

Caves
Pictograph (Stout) Cave would be closed year-round to all visitation. See Recreation section, caving and cave dependent recreation section – rock-climbing section.

Common to Alternatives 2-7

Areas of Critical Environmental Concern

Badlands ACEC
No changes in size or boundary designation of the existing Badlands ACEC under any of the action alternatives. See Recreation effects for Common to Alternatives 2-7 for effects of changes in the management of the Badlands ACEC in terms of access, road/trail system, VRM Class, and other guidelines. Under alt 2-7 regulations would require permits for group use in the Badlands WSA (ACEC) and close the area to comp events. These alternatives would also call for designated parking and access improvements, which may increase public knowledge of the regulations that apply to the area. Under Alternatives 2-7, if the Badlands WSA is designated as Wilderness by Congress, then the ACEC designation would be dropped. Wilderness designation would provide adequate protection for all resource values; therefore, ACEC designation would no longer be necessary.

Lower Crooked River ACEC
Alternatives 2-7 would remove the Lower Crooked River ACEC from ACEC designation. In 1988 the Lower Crooked River (Chimney Rock Segment) was designated a Wild and Scenic River in the Omnibus Oregon Wild and Scenic Rivers Act of 1988. The Lower Crooked River Chimney Rock Segment Management Plan provides guidance for protection of the resources within the ACEC. The W&SR boundary designation is nearly identical to the ACEC boundary designation; therefore, the ACEC designation is no longer necessary. There would be no effects from this change in designation since ACEC values would continue to be protected.

Smith Rock
In Common to Alternatives 2-7, although the area would not be designated as an ACEC (as in Alternatives 3 and 6), the scenic values would be protected through a VRM Class II designation and a motor vehicle travel closure.

Horse Ridge ACEC/RNA
Common to Alternatives 2-7, the area would be closed to overnight use/camping and closed to motorized use year-round. These new protective measures would be expected to minimize additional human use effects and maintain natural processes in the RNA. The direction to move to a designated trail system will help protect RNA values by reducing use of existing trails within the RNA.

Powell Buttes ACEC/RNA
Common to Alternatives 2-7, the area would be closed to camping/overnight use and closed to motorized travel year-round to maintain natural ecological processes within the RNA. No designated trails would be identified in the RNA.

Wagon Roads ACEC
In Alternatives 2-7, two segments of the existing Wagon Roads ACEC totaling approximately 75 acres would be removed from ACEC designation, for lack of importance and relevance, and two segments of the historic Horner and Bend/Prineville Roads totaling approximately 800 acres would be added to the Wagon Roads ACEC. Those segments of historic roads that are included are considered eligible to the National Register of Historic Places. All action alternatives would provide additional management guidance in support of conducting non-project related inventories to determine the extent of the resource and its associated features.

By adding 800 acres to the existing ACEC a greater range of resources would be protected. The additional acres add another benefit by facilitating management of areas rather than isolated road segments in a motorized trail development area. Closing the

entire area south of McGrath road to motorized use provides a greater opportunity for protection and interpretation of Historic Roads in that area. In addition, no mining activities or shooting would be permitted on BLM land south of McGrath Road, which contains the southern-most segment of this ACEC. Although military tracked vehicles and OHVs would be allowed to cross the historic roads at designated places within the ACEC, their effects would be minimized because they would be restricted from traveling over the length of the historic roads.

Caves
Under the action alternatives group use would be restricted to 6-8 people per group and a maximum of three tours per day. Significant/Nominated Caves would be closed to geocache use (See Caving/Cave Dependent Recreation for additional effects and limitations. The elimination of "open" travel management designations allows the BLM to consider caves when designating road and trail routes to minimize impacts to cave resources.

The Redmond Caves would be managed for bat hibernacula and management emphasis for this area would shift to day-use only.

Alternative 2

Areas of Critical Environmental Concern

Peck's Milkvetch ACEC
Alternative 2 would maintain the existing Peck's Milkvetch ACEC at 4,073 acres. In general, Peck's milkvetch would be protected and activities allowed within the existing and proposed ACEC expansions would have little to no effect on the plant.

Alfalfa Market Road ACEC
Alternative 2 would allow motorized vehicles on roads and trails, and would provide the least amount of protection for the ACEC values.

Caves
See Caving/Cave Dependent Recreation and Recreation Climbing sections for effects and limitations to caves.

Alternative 3

Areas of Critical Environmental Concern

Smith Rock ACEC
Alternatives 3 would designate a 2,119 acre Smith Rock ACEC, primarily for scenic values.

Peck's Milkvetch ACEC
Alternative 3 would maintain the existing Peck's Milkvetch ACEC at 4,073 acres. In general, Peck's milkvetch would be protected and activities allowed within the existing and proposed ACEC expansions would have little to no effect on the plant.

Juniper Woodland ACEC
In Alternative 3, the Juniper Woodland ACEC would be designated at 31,011 acres, which encompasses the entire Cline Buttes geographic area. The old-growth woodlands within this area are not contiguous and have various levels of fragmentation and effects from past human uses and wildfires. The Cline Buttes geographic area has a variety of mixed recreation and other uses proposed within action alternatives. Road and trail access would be allowed through a majority of the area. The portion of the proposed ACECs east of the Cline Falls Highway and west of the Deschutes River would be closed

to motorized use in Alternative 3. Exclusion of motorized travel provides substantial ecological protection from ground disturbance and the effects of illegal activities.

ACEC designation in Alternative 3 would give priority to protection and restoration of juniper woodlands. Evaluations for the presence and quality of old-growth woodland habitat would be required before any decision is implemented, which could affect old-growth values in the ACEC. If old-growth values are involved, appropriate protection, mitigation, or avoidance measures would be provided on a case-by-case basis. Old-growth values would be compared with the relative value of the proposed activity, use or land transfer action. Some decisions involving old-growth value trade-offs may be allowed if the proposed activity or use is determined to have an overall net benefit to public land resources. Alternate locations, including private land, would be considered for ROW corridors. Very little additional direct effects to old-growth woodlands from authorized activities would be expected to occur within ACECs. A "no net loss" policy would apply to ACECs; that is, a land exchange could be considered, but only if the acquired parcel is located within or adjacent to the ACEC and has equal or greater old-growth values and acreage.

In addition, the Tumalo Canals ACEC proposed in Alternatives 2, 5, 6, and 7 and the Juniper Woodlands ACEC in Alternative 3 would also provide an additional level of protection for an unknown acreage of the eastern fringe (east of Barr Road) of the currently identified habitat range of Peck's milkvetch.

Alfalfa Market Road ACEC
In Alternative 3, the 4,200 acre Alfalfa Market Road ACEC would be designated for protection of old-growth juniper woodland values. This block is an area of relatively intact old-growth woodlands south of Alfalfa Market Road and north of Bear Creek Road. This alternative would offer the greatest protection to ACEC values because it closes the area to motorized use and would rehabilitate areas and/or convert roads to trails. Although the area would not be designated as an ACEC, the values for which this area is designated an ACEC in Alternative 3 would be protected through additional management guidelines.

Caves
All Significant/Nominated Caves would be closed until management plans are prepared. See Caving/Cave Dependent Recreation and Recreation Climbing sections for effects and limitations to caves.

Alternative 4

Areas of Critical Environmental Concern

Powell Buttes ACEC/RNA
In Alternative 4, the ACEC would have the same restrictions as outlined in Common to All Alternatives. Additional protection for the ACEC/RNA would be provided through a travel management restriction outside the area that would prevent the placement of designated roads and trails on BLM-administered lands next to the ACEC/RNA.

Peck's Milkvetch ACEC
Alternative 4 would maintain the existing Peck's Milkvetch ACEC at 4,073 acres. In general, Peck's milkvetch would be protected and activities allowed within the existing and proposed ACEC expansions would have little to no effect on the plant.

Juniper Woodland ACEC
In Alternative 4, a smaller area of 6,756 acres (south of Thornburg Road and east of Barr Road) would be designated. The old-growth woodlands within this area are more contiguous and in relatively good ecological condition compared to most of the larger

Cline Buttes area. ACEC designation in Alternative 4 would give priority to protection and restoration of juniper woodlands. Evaluations for the presence and quality of old-growth woodland habitat would be required before any decision is implemented that could affect old-growth values in the ACEC. If old-growth values are involved, appropriate protection, mitigation or avoidance measures would be provided on a case-by-case basis. Old-growth values would be compared with the relative value of the proposed activity, use or land transfer action. Some decisions involving old-growth value trade-offs may be allowed if the proposed activity or use is determined to have an overall net benefit to public land resources. Alternate locations, including private land, would be considered for ROW corridors. Very little additional direct effects to old-growth woodlands from authorized activities would be expected to occur within ACECs. A "no net loss" policy would apply to ACECs; that is, a land exchange could be considered, but only if the acquired parcel is located within or adjacent to the ACEC and has equal or greater old-growth values and acreage.

In addition, the Tumalo Canals ACEC proposed in Alternatives 2, 5, 6, and 7 and the Juniper Woodlands ACEC in Alternatives 4 would also provide an additional level of protection for an unknown acreage of the eastern fringe (east of Barr Road) of the currently identified habitat range of Peck's milkvetch.

Alfalfa Market Road ACEC
In Alternative 4, the 4,200 acre Alfalfa Market Road ACEC would be designated for protection of old-growth juniper woodland values. This block is an area of relatively intact old-growth woodlands south of Alfalfa Market Road and north of Bear Creek Road. Motorized use would be allowed on a designated road system. This would provide more protection for the ACEC values than Alternative 1, where the travel designation is Open. Although the area would not be designated as an ACEC, the values for which this area is designated an ACEC in Alternative 4 would be protected through additional management guidelines.

Sage Grouse ACEC
Alternative 4 would designate 16,257 acres as the Sage Grouse ACEC within the core of existing sage grouse habitat in the planning area. Sage Grouse habitat would receive priority for protection and habitat improvements within the ACEC. See Wildlife effects for specific effects of designation of this ACEC on sage grouse and other resources.

Caves
See Caving/Cave Dependent Recreation and Recreation Climbing sections for effects and limitations to caves.

Alternative 5

Areas of Critical Environmental Concern

Peck's Milkvetch ACEC
Alternative 5 would increase the Peck's Milkvetch ACEC to 11,144 acres. In general, Peck's milkvetch would be protected and activities allowed within the existing and proposed ACEC expansions would have little to no effect on the plant.

Juniper Woodland ACEC
In Alternative 5, the portion of the proposed ACECs east of the Cline Falls Highway and west of the Deschutes River is proposed for closure to motorized use. Exclusion of motorized travel provides substantial ecological protection from ground disturbance and the effects of illegal activities.

Alfalfa Market Road ACEC:
Alternative 5 would allow motor vehicles on roads only, and this restricted motorized travel would also help to reduce ground-disturbing and illegal activity effects on old-growth woodlands in this area. The general effects described for the proposed Juniper Woodlands ACEC above also apply to the Alfalfa Market Road ACEC.

Caves
See Caving/Cave Dependent Recreation and Recreation Climbing sections for effects and limitations to caves.

Alternative 6

Areas of Critical Environmental Concern

Smith Rock ACEC
Alternative 6 would designate a 2,119 acre Smith Rock ACEC, primarily for scenic values.

Powell Buttes ACEC/RNA
In Alternative 6, the ACEC would have the same restrictions as outlined in Common to All Alternatives. Additional protection for the ACEC/RNA would be provided through a travel management restriction outside the area that would prevent the placement of designated roads and trails on BLM-administered lands next to the ACEC/RNA.

Peck's Milkvetch ACEC
Alternative 6 would increase the Peck's Milkvetch ACEC to 11,144 acres. In general, Peck's milkvetch would be protected and activities allowed within the existing and proposed ACEC expansions would have little to no effect on the plant.

Alfalfa Market Road ACEC:
Alternative 6 would allow motor vehicles on roads only. These proposed closures or restricted motorized travel would also help to reduce ground-disturbing and illegal activity effects on old-growth woodlands in this area.

Caves
See Caving/Cave Dependent Recreation and Recreation Climbing sections for effects and limitations to caves.

Alternative 7

Areas of Critical Environmental Concern

Peck's Milkvetch ACEC
Alternative 7 would increase the ACEC to 10,325 acres. In general, Peck's milkvetch would be protected and activities allowed within the existing and proposed ACEC expansions would have little to no effect on the plant.

Juniper Woodland ACEC
In Alternative 7, the portion of the proposed ACECs east of the Cline Falls Highway and west of the Deschutes River is proposed for closure to motorized use. Exclusion of motorized travel provides substantial ecological protection from ground disturbance and the effects of illegal activities.

Alfalfa Market Road ACEC:
Alternative 7 would close the area entirely to motorized travel, which would help protect the old-growth woodland values and reduce the effects ground-disturbing/illegal activities. However, this alternative would not designate the area as an ACEC.

Caves
See Caving/Cave Dependent Recreation and Recreation Climbing sections for effects and limitations to caves.

Cumulative Effects

Areas of Critical Environmental Concern

Powell Buttes ACEC/RNA
Potential cumulative effects could arise with the development of a resort on private land to the west of the ACEC/RNA. Activities on or near the resort could lead to additional human use of the ACEC/RNA. If lands such as the Wogman exchange are acquired, additional access to BLM-administered lands may be provided, resulting in increased visitation to the ACEC/RNA.

Land Uses

Livestock Grazing

Summary

This section outlines the effects anticipated on the grazing management program for each of the alternatives. 4-16, below, summarizes the changes in the total animal unit months (AUMs) available in the planning area for the current situation, and for each alternative. The numbers shown are for authorized AUMs, which average 81 percent of active preference AUMs. Average is based on 1990, 1995, and 2000, compared to current situation active preference. For allotment specific information on active preference AUMs for the No Action Alternative (Alternative 1), see Appendix G.

The current situation shows only AUMs authorized for allotments where permits are currently held by a permittee. For the other alternatives, the figure also shows estimated authorized use assuming that the BLM issues permits for all forage made available by plan direction, which sometimes includes vacant allotments and parcels outside of current allotments. See assumptions section, below, for further discussion on authorized use versus active preference.

Note that Table 4-15 shows AUM disposition for Alternative 7 assuming that applicable grazing permits are relinquished. At present, only some of these permits have been relinquished (identified in Appendix G as "vacant" allotments). The "close or RFA" category is a manager discretion category.

Table 4-15: Authorized use (AUMs) in planning area available for livestock grazing (open), closed, or placed in Reserve Forage Allotment status.

	Current situation	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Open	18,342	25,816	25,747	25,747	23,471	13,286	24,308	21,310
RFA	NA	NA	NA	NA	NA	NA	NA	1,998
Close or RFA	NA	NA	NA	NA	NA	NA	NA	1,781
Additional closed	NA	NA	NA	NA	NA	NA	NA	690

The above mentioned changes in areas available for grazing will affect the relative amounts of acres falling into low, moderate or high conflict or demand, as described in detail in the assumptions and analysis sections, below.

Reduced AUMs mean permittees must reduce herd size, lease other pasture and/or decrease the amount of time they graze livestock on public land. Table 4-16 shows the estimated effects the alternatives would have on the local economy. The definitions of full and limited flexibility appear in the assumptions section, below.

Assumptions

This section describes three sets of assumptions upon which the effects on the livestock grazing program are based. The first assumptions concern where the potential for conflict is greatest (and demand the least), and how these affect grazing permittees (as well as other public land users and adjacent private landowners). The second are those regarding how forage reductions directed by the various alternatives will affect grazing permittees, and how this in turn will affect the local economy. The third is other general assumptions. The assumptions section also includes a discussion of the models or formulas used to estimate conflict and demand, and a discussion of missing or incomplete information.

Conflict/Demand
The Common to All Alternatives objective for livestock grazing program management includes reducing conflicts. In the grazing section of this plan, conflict is defined as the problems that tend to increase as human uses in and adjacent to grazing allotments increase. These problems include stray livestock on busy roads and private land resulting from cut fences, inadequate fence maintenance, and failure to close gates. The more conflicts, the higher the management costs for both the permittee and the BLM, and the lower the satisfaction of the user and adjacent landowner. There is a corresponding drop in livestock operator demand for an allotment when the conflicts are high.

In Alternatives 1, 2, and 3, the assumption is made that existing and/or common to Alternatives 2-7 guidance will adequately solve conflicts, and that grazing permittees, recreationists, and other public land users and adjacent private landowners can make adjustments as needed to lessen conflicts. In Alternatives 4-7, the assumption is that Common to Alternatives 2-7 guidance does not go far enough in solving conflicts, and in some areas the preferred solution is to discontinue livestock grazing.

In Alternative 7, the definition of conflict is expanded to include an ecological conflict criterion. This criterion does not replace existing guidance (Standards for Rangeland Health, etc.), which adequately direct monitoring and assessment of ecological factors. Instead, it provides a quick estimate of the potential for ecological conflicts with livestock grazing and provides a way for BLM decision makers to integrate potential social, economic and ecological criteria when making decisions about livestock grazing use in an area.

Table 4-16: Change (percent) in cattle/calf sales in relation to total for Crook and Deschutes Counties, assuming permittees have full or limited flexibility to utilize other forage sources

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Full flexibility	Baseline	- 0.01	- 0.01	- 0.39	- 2.11	- 0.25	- 0.76
Limited flexibility	Baseline	- 0.05	- 0.05	- 1.58	- 8.44	- 1.02	- 3.04

Effects of the various alternatives can be assessed by comparing the relative amount of acres with Low, Moderate, or High potential for conflict or demand. Models are used in this analysis to estimate which allotments have the highest potential for conflict. The estimates are then used to make decisions about where conflicts might be high enough to warrant modification or discontinuance of grazing. The models used in this analysis to estimate conflict and demand are described in detail in Chapter 2.

Forage availability changes

The alternatives present a range of solutions for reducing conflict, some of which involve making some allotments unavailable for livestock grazing. Grazing reductions are temporary, for the life of the plan only, and would be re-evaluated at the next planning cycle.

One assumption is that closing an area to grazing is one way to reduce conflicts. In Alternative 7, some allotments are placed in Reserve Forage Allotment status, which is also assumed to reduce conflicts, as the allotment is not likely to be grazed as frequently as before. Also, grazing can be shifted from a higher conflict area to an RFA, which has the potential to reduce conflict and increase permittee flexibility to deal with forage losses.

Permittees respond to loss of public AUMs by increasing productivity on base properties, purchasing or leasing alternate pasture, buying hay and feeding on owned or leased land, or by selling all or a portion of their herd. Permittee's options are more flexible when they have a larger ratio of owned/leased pasture versus public land, when there is leasable pasture nearby and/or the permittee can easily/cheaply haul animals to new pasture, when there are few seasonal restrictions on public and private land they graze, or when they ranch as a "hobby" and can afford the increased costs of alternate pasture/feed sources.

The economic analysis estimates the range of effects under both full-flexibility and limited flexibility scenarios. Neither scenario represents all permittees, and actual effects will be dependent on the private business decisions made by individual permittees based on their individual circumstances.

A permittee's ability to withstand AUM losses depends on his reliance on federal forage. Reliance is high when permittee's private land acreage is low, or his ability to haul livestock to alternate pastures is low. For the planning area, these conditions are usually met, meaning reliance is high. Most permittees in the planning area have little private land, probably generally 160 -1,000 acres. They run few livestock (most have less than 50 head), so they are unlikely to be able to bear the cost of shipping livestock to other available pasture.

We do not know the permittees' dependence on federal forage, so we do not know how AUM losses would affect individual permittee's overall grazing operation. A high dependence would make it more likely that AUM losses would cause the permittee to cease grazing altogether, perhaps even selling his private property if the only income came from livestock grazing. A permittee with low dependence on federal forage could more easily absorb AUM losses with no change to his overall grazing operation.

Most Alternative 7 forage reductions would not take place unless the grazing permittee voluntarily relinquishes his/her permit. This is assumed to reduce effects on the individual permittee, though the impact on the local economy would be the same as if the closure were forced.

Authorized use was used to compare alternatives because it more accurately reflects use than does active preference. Active preference is generally the maximum available on a specific permit, while authorized use is the forage actually applied for and used.

Authorized AUMs for the current situation are displayed but B/LP RMP direction is used for comparison with UDRMP alternatives. This is because the amount of vacant and unallocated AUMs in the current situation is not necessarily typical, since the BLM has deferred requests for permits for these parcels pending completion of the UDRMP. For analysis purposes, B/LP direction is assumed to more accurately reflect baseline conditions of the No Action Alternative.

The No Action Alternative (Alternative 1) assumes that demand exists for currently available but unallotted AUMs, and permits will be issued following completion of the RMP, consistent with existing management direction.

The action alternatives are compared to the No Action Alternative to display the differences in future outcomes by alternative relative to the projected outcome under continued implementation of existing management direction.

The economic analysis uses the 1998-2002 average cattle/calves inventory for Deschutes and Crook Counties (Jefferson and Klamath represent small portions of the planning area and are not included in this number), less calves inventory of about 40 percent (to be consistent with BLM, which counts each cow-calf pair as one AUM). This is 49,484 AUMs, of which the BLM current authorized use of 18,342 represents 3.09 percent. The average length of the grazing season was assumed to be three months. Historic records indicate the 1998-2002 average value of cattle and calf sales in Crook and Deschutes Counties was $25,991,000 (Oregon State University Extension Service, Oregon Agricultural Information Network, 2003, http://ludwig.arec/edu/oain/).

Effects of the various alternatives can be assessed by comparing estimated authorized use across the alternatives, displayed above in Table 4 - 16, calculating how the AUM changes relate to cow/calf sales, and putting these changes in perspective with the total cow/calf sales in the local economy.

Other Assumptions

Since this plan does not propose changes in livestock grazing intensity or season of use, and existing guidance (Standards for Rangeland Health, Clean Water Act, others) direct BLM to assess and change management to address problems, the ecological effects of livestock grazing are generally not reviewed in this plan. The Standards for Rangeland Health provide a system to monitor and assess and make changes (see further discussion in Common to All Alternatives guidance). A study (Rowe *et al.*., 2001) in a rapidly developing area in Colorado examined the factors influencing ranchers who graze on public land to sell their base property (private land to which the grazing privileges are attached). "Since ranch land is often the primary target for subdivision, ranchers play an important role in this pattern of land use change," say the authors. A rancher's decision to sell is affected by changes in federal grazing policy, local land-use planning efforts, and development of surrounding land. Changes in zoning and development can raise property values, increase taxes, and require more frequent checks of gates, fences, and livestock. But the decision is also influenced by non-economic factors, say the authors. "Ranchers continue to ranch despite financial difficulties. They stay because of...sense of place, attractiveness of lifestyle, family values, and tradition."

Incomplete or unavailable data

In some cases, constructing a new fence to discontinue livestock grazing in an area of potential "conflicts" might not be consistent with other management objectives. In these cases it might be necessary to close the entire pasture to livestock grazing, affecting more acres/AUMs/permittees than shown in the present analysis. Site-specific analysis would be necessary to determine if the larger closure areas were justified.

The effect of limiting livestock use after vegetation/soil disturbances is unknown. The location of disturbances and the site-specific conditions are not known, thus the exact limitations are unknown, and therefore, the effects are unknown.

The AUM reductions for Alternatives 2-6 would be implemented two years from publication of the FEIS, or immediately upon approval of the RMP for those permittees who waive their rights to 2-year notice (43 CFR 4110.4-2). The AUM reductions in Alternative 7 would be implemented immediately upon approval of the RMP for "vacant" allotments in the "close" category, and upon voluntary permit relinquishment for other allotments in the "close" category. Allotments would be placed in RFA status immediately upon approval of the RMP for "vacant" allotments in the "RFA" category, and upon voluntary permit relinquishment for other allotments in the "RFA" category. "Vacant" allotments in the "Close or RFA" or "Open or RFA" categories would be closed or placed in RFA status, respectively, immediately upon approval of the RMP. Other allotments in these two categories would be closed, placed in RFA status, or left open at the time the permits were relinquished, following decision-maker review of the issues for the particular allotment.

As conditions such as county zoning, open/closed range, and special status species habitat change over the life of the RMP, the outcome of Alternatives 4, 5, 6 and 7 would change, placing more allotments into close or RFA status. It is not clear where or how fast conditions will change, so we have not predicted how these changes will affect the outcome.

Analysis of the Alternatives

Common to All Alternatives
Under all alternatives, livestock grazing would continue to be allowed in the planning area, with authorized use expected to be at least 72 percent of current authorized use, or at least 50 percent of Alternative 1 direction. In all alternatives, allotment monitoring, evaluation, and rangeland health assessments (and subsequent site-specific analysis) may result in changes in forage allocation and season of livestock use, and construction of new fences, pipeline, and other range developments to meet allotment and other resource goals and objectives. All areas currently closed to grazing would stay closed in all alternatives.

Effectiveness of mitigation
Existing guidance directs BLM to modify livestock grazing where it prevents meeting any of the Standards for Rangeland Health.

Alternative 1
Livestock grazing would continue on 388,823 acres, with 25,816 AUMs. No permittees would be affected by AUM reductions, as there would be no reductions other than those occurring as a result of Common to All Actions.

Direct
Livestock grazing would continue to be authorized on 388,823 acres in the planning area, providing an estimated annual authorized use of 25,816 AUMs.

Indirect
Alternative 1 is the baseline to which other alternatives are compared. Note that Alternative 1, the No Action Alternative, is not the same as the current situation. Alternative 1 represents an estimated increase of 7,474 AUMs authorized use from the current situation, and a corresponding increase in livestock sales of 1.26 to 5.03 percent. Estimated sales of cattle and calves under Alternative 1 direction would increase by $327,000 to $1,308,549 from the current situation. This would increase the size of the

livestock industry within the planning area, especially in the La Pine area where the unalloted areas are located. In this alternative, BLM-administered forage would provide for just over four percent of local cow/calf sales.

There would be fewer authorized AUMs in all action alternatives than in Alternative 1.

Total management costs (BLM and grazing permittee) to patrol and/or repair fences would be greatest in Alternatives 1, 2, and 3, and least in Alternative 5.

Common to Alternatives 2-7
Livestock grazing would continue on 228,685 to 388,271 acres, with 13,286 to 25,747 AUMs. One to fifty permittees would be affected by AUM reductions, and there would be a 0.01 to 8.44 percent reduction in local cow/calf sales. Conflicts between livestock grazing and other uses would vary by alternative, from approximately the same level as in Alternative 1 in Alternatives 2 and 3, to reduced levels in Alternatives 4, 5, 6, and 7.

Direct
The action alternatives provide for additional protection for a portion of the historic canals in the Cline Buttes area, resulting in livestock grazing being excluded from about 550 acres in one allotment (Whiskey Still, #5079). Other areas would be closed to livestock grazing to reduce conflicts, but the amount would vary by alternative from zero acres to thousands of acres. Considering both the historic canal closures and the closures to reduce conflicts, the action alternatives would provide 69 to 12,530 fewer authorized AUMs than Alternative 1.

Indirect
In all action alternatives, there would be a method for estimating potential for conflict in allotments between livestock grazing and other uses. This would enable the BLM to better prioritize its response to problems.

The road proposed for Alternatives 2 - 7 (slightly shorter in Alternative 3) would mean greater gate/fence patrol and repair needs (costs).

The seasonal use restriction in allotments containing ACECs designated for Peck's milkvetch would reduce permittee flexibility in dealing with other restrictions or forage reductions.

Alternative 2
Livestock grazing would continue on 388,271 acres, with 25,747 AUMs. One permittee would be affected by AUM reductions, and there would be a very minor reduction in local cow/calf sales. Expected conflicts between livestock grazing and other uses would be similar to those expected in Alternatives 1 and 3, and more than those expected in Alternative 4, 5, 6, and 7.

Direct
Livestock grazing would continue to be authorized on 388,271 acres in the planning area, providing an estimated annual authorized use of 25,747 AUMs. This represents a less than one percent reduction in AUMs from Alternative 1. The only AUM reduction is the one to protect historic canals, as described in Common to Alternatives 2-7.

Indirect
The AUM reductions in this alternative (and Alternative 3) would be relatively minor, affecting only one permittee and less than one percent of the total AUMs in the planning area.

Total management costs (BLM and grazing permittee) to patrol and/or repair fences would be greatest in Alternatives 1, 2, and 3, and least in Alternative 5.

The effect on local livestock sales would be minimal, a 0.01 to 0.05 percent reduction, depending on permittee flexibility in securing alternate forage sources. An estimated $3,000 to $12,000 in livestock sales would be lost compared to Alternative 1. This reduction is minimal and is unlikely to have measurable effects on the local economy. In this alternative, BLM-administered forage would provide for just over four percent of local cow/calf sales.

Alternative 3

Livestock grazing would continue on 388,271 acres, with 25,747 AUMs. One permittee would be affected by AUM reductions, and there would be a very minor reduction in local cow/calf sales. Expected conflicts between livestock grazing and other uses would be similar to those expected in Alternatives 1 and 3, and more than those expected in Alternative 4, 5, 6, and 7.

Direct

Livestock grazing would continue to be authorized on 388,271 acres in the planning area, providing an estimated annual authorized use of 25,747 AUMs. This represents a less than one percent reduction in AUMs from Alternative 1. The only AUM reduction is the one to protect historic canals, as described in Common to Alternatives 2-7.

Indirect

The AUM reductions in this alternative (as in Alternative 2) would be relatively minor, affecting only one permittee and less than one percent of the total AUMs in the planning area.

Total management costs (BLM and grazing permittee) to patrol and/or repair fences would be greatest in Alternatives 1, 2, and 3, and least in Alternative 5.

The effect on local livestock sales would be minimal, a 0.01 to 0.05 percent reduction, depending on permittee flexibility in securing alternate forage sources. An estimated $3,000 to $12,000 in livestock sales would be lost compared to Alternative 1. This reduction is minimal and is unlikely to have measurable effects on the local economy. In this alternative, BLM-administered forage would provide for just over four percent of local cow/calf sales.

Alternative 4

Livestock grazing would continue on 348,394 acres, with 23,471 AUMs. Twenty permittees would be affected by AUM reductions, and there would be a 0.039 to 1.58 percent reduction in local cow/calf sales. Expected conflicts between livestock grazing and other uses would be less than those expected in Alternatives 1, 2, and 3; more than those expected in Alternative 5, and comparable to those expected in Alternative 6. The expected conflicts would probably be similar to those expected for Alternative 7, but the comparison is difficult because conflict is not defined exactly the same, and it is unknown when or how many permits would be relinquished in Alternative 7.

Direct

Livestock grazing would be discontinued in various allotments to protect historic canals (as mentioned in Common to 2-7), and to reduce conflicts with other uses. Areas where the analysis models (described fully in Chapter 2) indicate conflicts are likely to be high would be closed to grazing, as would areas where the analysis models indicate demand is likely to be low. Livestock grazing would continue to be authorized on 348,394 acres in the planning area, providing an estimated annual authorized use of 23,471 AUMs. This represents a nine percent reduction in AUMs from Alternative 1.

Indirect

About 20 permittees would lose their BLM permits and need to find alternate forage, or reduce their herds.

By discontinuing livestock grazing in allotments that exceed conflict/demand thresholds, the potential for conflicts would be reduced in this alternative (and in Alternatives 5, 6, and 7), compared to the potential for conflicts in Alternatives 1, 2, and 3. This would mean a potential decrease in BLM and grazing permittee management costs. The potential for conflicts that would remain after closures in this alternative is likely to be more than the level remaining in Alternative 5, but less than the level remaining in Alternative 6. The comparison to Alternative 7 is difficult because conflicts are defined slightly differently than in Alternatives 2-6. Fencing areas of high conflict in Alternative 4 would cost the BLM approximately $32,000 (8 miles of fence).

The effect on local livestock sales would be limited, a 0.039 to 1.58 percent reduction depending on permittee flexibility in securing alternate forage sources. An estimated $108,000 to $416,000 in livestock sales would be lost compared to Alternative 1. This reduction would impact the livestock industry but is likely to have minimal effects on the local economy. In this alternative, BLM-administered forage would provide for just less than four percent of local cow/calf sales.

Alternative 5
Livestock grazing would continue on 228,685 acres, with 13,286 AUMs. Fifty permittees would be affected by AUM reductions, and there would be a 2.11 to 8.44 percent reduction in local cow/calf sales. Expected conflicts between livestock grazing and other uses would be less than those expected in all other alternatives.

Direct
Livestock grazing would be discontinued in various allotments to protect historic canals, and to reduce conflicts with other uses. Areas where the analysis models indicate conflicts are likely to be moderate or high would be closed to grazing, as would more urban areas (see definition of urban in Chapter 2) where the analysis models indicate demand is likely to be low. Livestock grazing would continue to be authorized on 228,685 acres in the planning area, providing an estimated annual authorized use of 13,286 AUMs. This represents a 49 percent reduction in AUMs from Alternative 1, the largest reduction of any alternative.

Indirect
About 50 permittees would lose their BLM permits and need to find alternate forage, or reduce their herds.

By discontinuing livestock grazing in allotments that exceed conflict/demand thresholds, the potential for conflicts would be reduced in this alternative (and in Alternatives 4, 6, and 7), compared to the potential for conflicts in Alternatives 1, 2, and 3. This would mean a potential decrease in BLM and grazing permittee management costs. The potential for conflicts that would remain after closures in this alternative is likely to be less than the level remaining in Alternatives 4 and 6. The comparison to Alternative 7 is difficult because conflicts are defined slightly differently than in Alternatives 2-6.

Total management costs (BLM and grazing permittee) to patrol and/or repair fences would be the least in Alternative 5. However, BLM management costs may actually be highest in this alternative, since the BLM would have to take over fence maintenance in some areas formerly maintained by grazing permittees.

The effect on local livestock sales would be minimal, a 2.11 to 8.44 percent reduction depending on permittee flexibility in securing alternate forage sources. An estimated $576000 to $2,221,000 in livestock sales would be lost, compared to Alternative 1. This reduction would affect the livestock industry and is likely to have measurable effects on the local economy. These induced impacts were not quantified. In this alternative, BLM-administered forage would provide for about 2 percent of local cow/calf sales.

Alternative 6
Livestock grazing would continue on 347,522 acres, with 24,308 AUMs. Eight permittees would be affected by AUM reductions, and there would be a 0.25 to 1.02 percent reduction in local cow/calf sales. Expected conflicts between livestock grazing and other uses would be less than those expected in Alternatives 1, 2, and 3; more than those expected in Alternative 5, and comparable to those expected in Alternative 4. The expected conflicts would probably be similar to those expected for Alternative 7, but the comparison is difficult because conflict is not defined exactly the same, and it is unknown when or how many permits would be relinquished in Alternative 7.

Direct
Livestock grazing would be discontinued in various allotments to protect historic canals, and to reduce conflicts with other uses. Allotments in the rural areas (see definition of rural in Chapter 2) where the analysis models indicate demand is likely to be low or moderate would be closed to livestock grazing, to reduce conflicts. Livestock grazing would continue to be authorized on 347,522 acres in the planning area, providing an estimated annual authorized use of 24,308 AUMs. This represents a six percent reduction in AUMs from Alternative 1.

Indirect
About eight permittees would lose their BLM permits and need to find alternate forage, or reduce their herds.

By discontinuing livestock grazing in allotments that exceed conflict/demand thresholds, the potential for conflicts would be reduced in this alternative (and in Alternatives 4, 5, and 7), compared to the potential for conflicts in Alternatives 1, 2, and 3. This would mean a potential decrease in BLM and grazing permittee management costs. The potential for conflicts that would remain after closures in this alternative is likely to be more than the level remaining in Alternatives 4 and 5. The comparison to Alternative 7 is difficult because conflicts are defined slightly differently than in Alternatives 2-6.

The effect on local livestock sales would be minimal, a 0.25 to 1.02 percent reduction depending on permittee flexibility in securing alternate forage sources. An estimated $69,000 to $267,000 in livestock sales would be lost compared to Alternative 1. This reduction would impact the livestock industry but is likely to have minimal effects on the local economy. In this alternative, BLM-administered forage would provide for about four percent of local cow/calf sales.

Alternative 7
Livestock grazing would continue on at least 279,321 acres, with at least 21,310 AUMs. One permittee would be affected by mandatory AUM reductions, and there would be a 0.76 to 3.04 percent reduction in local cow/calf sales. Expected conflicts between livestock grazing and other uses would be less than those expected in Alternatives 1, 2, and 3. The expected conflicts would probably be similar to those expected for Alternatives 4 and 6, but the comparison is difficult because conflict is not defined exactly the same, and it is unknown when or how many permits would be relinquished in Alternative 7.

Direct
Livestock grazing would be discontinued in various allotments to protect historic canals, and to reduce conflicts with other uses. The combination of conflict and demand criteria that would lead to allotment closure in this alternative is described in Chapter 2. Assuming all applicable permits were relinquished, the reduction in AUMs would be between three and eight percent. Assuming no new permits were relinquished other than those already in "vacant" status, the reduction would be between .06 and three percent. The first number assumes all allotments in the "close or RFA" category would be placed in RFA status; the second assumes they would all be closed. An additional

eight percent of the AUMs would be placed in RFA status (also assuming permit relinquishment). The estimated authorized AUMs in "open" status are 21,310 AUMs on 279,321 acres.

Indirect
Only one permittee would be affected by mandatory AUM reductions. The remaining AUM reductions would be accomplished through voluntary permit relinquishments.

By discontinuing livestock grazing in allotments that exceed conflict/demand thresholds, the potential for conflicts would be reduced in this alternative (and in Alternatives 4, 5, and 6), compared to the potential for conflicts in Alternatives 1, 2, and 3. This would mean a potential decrease in BLM and grazing permittee management costs. The level of potential conflicts that would remain after closures in this alternative varies, depending on whether permittees relinquish permits in the "close" category. The comparison to Alternatives 2-6 is difficult because conflicts are defined slightly differently than in this alternative.

The effect on local livestock sales would be minimal, a 0.76 to 3.04 percent reduction depending on permittee flexibility in securing alternate forage sources. An estimated $207,000 to $799,000 in livestock sales would be lost compared to Alternative 1. This reduction would impact the livestock industry and is likely to have measurable effects on the local economy. These induced impacts were not quantified. In this alternative, BLM-administered forage would provide for 3.6 percent of local cow/calf sales.

Creating RFAs would increase permittee flexibility to withstand short-term AUM reductions, and would provide the BLM with leverage to help rest pastures after wildfire or for other resource reasons.

The voluntary relinquishment for most allotment closures means effects of AUM reductions on individual permittees would be more manageable, because the permittee can choose when (or if) to relinquish his/her permit.

Cumulative effects
Livestock grazing is historically important in the planning area both culturally and economically, although the contribution from BLM managed public land is small relative to total cattle/calf production. On average, grazing permittees in the planning area use BLM managed land for about 20 percent of total feed. However, in several cases, over 90 percent of a permittee's operational forage base consists of federally administered grazing land. Although federally administered land might comprise only a minor portion of a permittee's total forage, it may well be that without that portion the permittee's operation would no longer be viable.

In Oregon, federal permittees use agency forage for 23 percent of total feed (Frewing-Runyon, 1995). Eastern Oregon permittees are less dependent on public forage; the average reliance of eastern Oregon permittees on federal forage (BLM and Forest Service) is 11 percent.

While Oregon's current Statewide Planning Goals and Guidelines manage the transition of land use in the State, future declines in the private agricultural land base are forecast to continue, thereby increasing the importance of remaining federal land resources in the region. Over the next 100 years, it has been projected that total western range lands will probably decrease by 25 to 40 percent (Holechek, 2001).

Authorized use has declined approximately three percent per year on BLM managed land in the planning area over the last decade. Use on the Deschutes and Ochoco national Forests (including the Crooked River National Grassland) has declined about 2.6 percent per year since 1995 (personal communication, Byron Cheney and Don Sargent,

USFS employees). The Draft EIS for the Interior Columbia Basin Ecosystem Management Plan estimated a one percent reduction per year for the basin. The cumulative effect of a continuation of these declines combined with the AUM reductions proposed in some alternatives in the UDRMP may be that more permittees' operations become unprofitable than expected under either scenario alone.

Some of the permittees affected by AUM reductions (one is affected in Alternatives 2, 3, and 7; 20 in Alternative 4; 50 in Alternative 5; 8 in Alternative 6) may not have enough remaining forage (public and/or private) to continue livestock grazing, and may decide to sell their base properties. If this were to occur, given local trends the property might be converted from rangeland to low density residential use, potentially increasing conflicts for remaining public land livestock grazing use in the area. As conflicts increase, additional allotments would meet conflict/demand criteria for grazing discontinuance.

In recent years, there have been steady decreases in the supply of private grazing lands in the region as rapid population growth, resort and other residential development have reduced or fragmented the existing land resources, making grazing less attractive or cost-effective. According to some analysts, for every acre directly lost to development, another three to ten acres may be lost from the ranching base due to fragmentation (Liffman, Huntsinger and Forero, 2000).

Conclusions
Alternative 1 (closely followed by Alternatives 2 and 3) results in the largest number of acres and AUMs remaining available for livestock grazing, while Alternative 5 results in the lowest, about 49 percent less than Alternative 1.

The contribution to local livestock sales is correspondingly greatest in Alternative 1 (about 4 percent), and least in Alternative 5 (about 2 percent). The effect of forage reductions on individual permittees would be lowest in Alternatives 1, 2, 3, and 7, and highest in Alternative 5 (50 permittees). These effects on individual permittees are unknown, but in some cases the result would be that the permittees cease ranching and sell their base properties.

Conflicts between livestock grazing and other uses on public and adjacent private land are less likely in Alternative 5, which has the fewest acres open to grazing. Alternatives 4, 6, and 7 are likely to have conflict levels somewhat higher than those expected for Alternative 5, but lower than those expected for the other alternatives.

Minerals

Summary

Due to data gaps and uncertainties related to the timing, amount, and location of mining operations, a quantitative effects analysis is not possible for any of the alternatives. However, the general direct, indirect, and cumulative effects resulting from land allocations open to mining and land allocations designated as avoidance and exclusion areas can be identified. Mining that may occur on land open to those uses would cause indirect effects including but not limited to noise, dust, asphalt batching odor, ground disturbance, erosion, the spread of noxious weeds, and truck traffic. These indirect effects will likely cause some degree of conflict with residents, recreational users, natural resources, and cumulatively add to the past, present, and future effects caused by other land uses and activities.

Exclusion areas, avoidance areas, and other restrictions may add costs to the mining industry and add cumulatively to other present and future restrictions. Most of the avoidance and exclusion areas occur where the potential for occurrence is moderate for geothermal resources and low for fossil fuels and locatable minerals. Thus, the effects of

the restrictions and land allocations with respect to locatable mineral entry and mineral leasing are expected to be minimal. Moreover, historical use patterns suggest that the overall potential for development of leasable and locatable minerals during the life of this plan is low; the environmental and social effects of developing these mineral types are not expected to be notable. Most of the effects related to mining are expected to be associated with mineral material sales as suggested by historical use and forecasted demand. In some alternatives, potential sites identified by ODOT as having large reserves of high quality rock are restricted or unavailable and could lead to increased construction costs.

It is important to note that the following comparison of the alternatives with respect to acres available to mining does not necessarily reflect a comparison of how much mining will occur. There is no direct correlation between the number of acres available for mining and the amount of mining that would take place. What matters is where the economical high quality rock deposits are in relation to exclusion and avoidance areas, not how many acres are available. Therefore, it is possible for an alternative with relatively few acres available for mining to result in more mining on public lands than another alternative with more acres available. However, it is not possible to quantify the effects of mining from each alternative because the locations of all economical high quality rock deposits and how they are distributed across the planning area are not known.

Assumptions

The area available for locatable and leasable minerals is common to all alternatives and no less than 75 percent of the planning area is available for mineral materials sales in any alternative. At least some known mineral material deposits identified by ODOT (1998) are available in each alternative. It is therefore assumed that the reasonably foreseeable development scenarios for locatable, leasable and saleable minerals in the planning area are the same under all alternatives. More detailed assumptions and mineral development scenarios are provided in Appendix I.

Locatable Minerals
Historically, mining of locatable minerals in the planning area has been sporadic with minor exploration and production of mercury and diatomite. Past exploration and development of mercury deposits from the 1920s to the 1950s in the southeastern part of the planning area resulted in small trenches, adits and shafts, each typically disturbing less than an acre. Future exploration and production would probably result in similar scales of ground disturbance unless a large deposit is discovered. Little or no exploration or developments of mercury deposits are expected to occur during the life of this plan. Diatomite was historically produced from private lands east of Terrebonne and was mined by the open pit method. If diatomite is discovered and produced from adjacent BLM-administered lands, up to several hundred acres of ground disturbance could result. However, such large-scale developments of diatomite are not expected during the life of this plan.

There are currently 26 unpatented mining claims and 4 millsite claims within the planning area and two notices have been filed under the BLM Surface Management Regulations (43 CFR 3809). Based on historic trends, it is assumed that 5-10 additional mining claims will be filed within the planning area in the next 20 years. Notice-level exploratory operations on any existing or future claim may disturb up to 5 acres of ground and plan level operations may disturb more than 5 acres. It is assumed that 2-3 notice-level and 1-2 plan-level operations will occur during the life of this plan.

Leasable Minerals

Oil and Gas

Based on the history of past drilling and the low to moderate potential for oil and gas, exploration will probably continue to be sporadic. During the life of this plan, 1-2 exploratory wells for oil and gas are expected to be drilled in the eastern part of the planning area where the potential is moderate. The success rate of finding oil or gas is predicted to be no greater than 10 percent based on the average exploratory well success rate in the U.S. Each exploratory well site is expected to disturb up to 6 acres including new access roads and will be occupied for less than 12 months during the drilling, testing, and abandonment phases. It is not expected that any development of oil or gas fields will occur during the life of this plan. However, for economically viable development to occur, a gas field would need to have at least 50-60 billion cubic feet (BCF), corresponding to an area of at least 200 acres. Such a field would require 5 producing wells (including the discovery well) and require 30 to 60 miles of pipeline with a 30-ft width of ground disturbance.

Geothermal Power Plant Development

It is likely that the geothermal anomaly at Powell Buttes will be explored further during the life of this plan. A study by Brown and others (1980) indicated a potential for boiling temperature fluids at depths of approximately 1000 meters. However, the presence of an economically viable geothermal system has not been proven. According to Brown and others (1980), further geophysical (gravity, magnetic, and electrical) surveys and the drilling of 20 150-meter gradient-stratigraphy holes on the both sides of the buttes to further define the thermal anomaly. Moreover, several 1000-meter holes would be required to directly test for elevated temperatures with usable fluids. The development of a power plant in the Powell Buttes area is not expected to occur during the life off this plan. However, if a 24-megawatt power plant were to be developed, 5-7 production wells and 1-2 injection wells would be drilled with a ground disturbance of 2-6 acres per well. The power plant facilities would involve 5-10 acres and pipelines and power lines would disturb 3-6 acres. In total, up to about 75 acres could be disturbed by the entire operation. Owing to the predominance of private lands in the Powell Buttes area, it is not known how much development would affect BLM-administered lands if development were to occur.

Direct use of Geothermal Energy

Geothermal resources have many direct use applications including space heating and cooling of residences, businesses and green houses, and applications in aquiculture, industry, and therapeutic bathing. The surface disturbance could range from a few acres for a single well and some greenhouses to tens of acres for larger agricultural or aquacultural developments.

Salable Minerals

It is assumed that the demand for mineral materials will continue to increase in conjunction with the population growth in Central Oregon. The mineral material supply from existing private and public sources in the planning area appears to exceed the foreseeable demand over the next 20 years. However, based on the distribution of public and private ownership, ODOT is not able to consistently offer a public mineral material source for its construction projects in order to increase bidder competition (ODOT, 1998). Owing to the existing supply and the distribution of ODOT's prospective mineral material sites across the planning area, it is assumed that 3-4 new mineral material sites will be developed in the next 20 years. Approximately 15-20 acres of ground disturbance would occur to accommodate each mine, including rock crushing operations, truck turn-around areas, and aggregate stockpile areas. Moderate to heavy traffic could occur on up to 5 miles of non-paved access roads during periods of site utilization. Up to 1 mile of new access road may be constructed to each site. The cumulative effect of new mineral material sites is expected to be up to 60 acres of ground disturbance and up to 3 miles of new access road.

Incomplete/Unavailable Information

There are gaps in the data that limit the extent and scope of the effects analysis:

- Although common variety mineral materials occur just about everywhere, economically viable high quality rock deposits suitable for asphalt are relatively scarce. It is also likely that not all economically viable mineral material deposits are known.
- Oil, gas, and geothermal exploration of the planning area has been minimal so the potential for development is unknown.
- The geothermal investigation conducted at Powell Buttes by Brown and others (1980) is incomplete and inconclusive. More work is necessary to determine the economic viability of this site and the potential for development.
- The future locations of mineral operations are not known due to unknown locations of undiscovered deposits and uncertain future demand, technology, and energy and metal prices.
- There is some uncertainty with known undeveloped mineral material deposits (identified by ODOT) because development is contingent upon approval by the BLM.

These data gaps do not allow for quantitative analysis of the effects. When lands are withdrawn, closed, or restricted to mining practices, known and undiscovered economically viable mineral deposits may become unavailable or uneconomic due to the restrictions over the 10-20 year life of this plan. In cases where undiscovered mineral deposits are present, the specific effects of closing or restricting areas are unknown. The effects of allocating lands as open for mineral development also cannot be quantified due to the uncertainty of when, where, or how many mining operations will take place.

Analysis of the Alternatives

Common to All Alternatives

The following decisions in the B/LP RMP will be carried forward:
- 396,185 and 366,640 acres will continue to be available for locatable mineral development and mineral leasing respectively.
- The no surface occupancy stipulation for fluid mineral leasing on the 4,073-acre Peck's Milkvetch ACEC, the 510-acre Powell Butte RNA, and the 609-acre Horse Ridge RNA and on 16,480 acres around Prineville Reservoir will continue.
- The withdrawal of the Horse Ridge RNA from mineral entry under the 1872 mining laws will be carried forward.

The direct and indirect effects of each alternative will primarily result from public land allocations available for mining, allocations where mining is restricted, and allocations where land is closed to or withdrawn from mineral entry. Since the alternatives vary by the number of acres in each of the allocation categories, the types of effects are the same for each alternative. Therefore, the effects may vary only in magnitude with each alternative depending on where important mineral deposits are in relation to the land allocations.

The social, economic, and environmental effects of each alternative with respect to mining are difficult to quantify due to the uncertainties of the industry. Each alternative specifies only those lands available and not available for mineral entry but does not authorize any specific mining operation. Therefore, the number and locations of future mineral material pits, drilling sites, and other mining developments are generally not known, though a few potential mineral material sites have been identified by the Oregon Department of Transportation (ODOT). Also not foreseeable are what other mineral materials may become popular for decorative use or become industrially important. Likewise, the interest in mineral leasing and locatable mineral development cannot

be foreseen due to changing technologies, dynamic energy prices, metal values, and demand.

The direct effect of designating lands for mining uses is the availability of those lands for filing mining claims and applications for mineral materials and mineral leasing. The approval of mining operations would lead to indirect effects including but not limited to ground disturbance, dust, noise, asphalt batching odor, erosion, the spread of noxious weeds, and/or permanent removal of mineral resources would occur and may cause varying degrees of conflicts with recreation, residents, and/or natural resources. Mining in the La Pine area may expose groundwater to evaporation and contamination due to the shallow water table. Developed mineral material sites are often used for target shooting and OHV riding, resulting in increased amounts of litter, noise, and dust, and may cause further conflicts between recreation and mining. Ground-disturbing effects would primarily be confined to mining sites whereas the dust, noise, and asphalt odor could have adverse effects on adjacent public and private lands up to a few miles away. These effects are less likely to occur in avoidance areas such as ACECs, RNAs, and WSAs and in areas with other restrictions to mitigate conflicts with other land uses and management objectives.

Mineral material development under sales and free use contracts is expected to continue as the most important mineral use within the planning area owing to the expanding population and the corresponding demand for aggregate materials. The direct effect of restrictions and closures imposed on mineral material mining is that some known and unknown economically viable mineral material sources would be unavailable for development. Depending on the location, restrictions and closures could restrict or make some sites unavailable and may have the indirect effect of requiring the ODOT and other users of mineral materials to utilize alternative sources to meet demand. Hence, ground disturbance, dust, and noise could occur elsewhere on private, state, county, Forest Service, or other BLM lands within the planning area and up to about 30 miles outside of the planning area boundary. Aggregate from alternative sources may have lower quality and/or longer haul distances. Longer haul distances would increase fuel consumption, emissions, and the probability for accidents. Mineral materials from BLM-administered lands are provided to ODOT free of charge so the aggregate cost would be affected if privately owned sources are used as alternatives. Moreover, ODOT typically receives fewer bids on construction projects when a public source of material materials is not available, resulting in higher construction costs due to limited bidder competition (ODOT 1998). Thus, aggregate end-product longevity, construction timetables, road maintenance costs, taxpayer benefit and/or bidder profitability may be indirectly affected by the restrictions and closures. Because the income for local bidders and public funds from state and federal sources are involved, the economy may be indirectly affected at all levels, most notably at the local level.

The direct effect of restrictions on mineral leasing and locatable mineral entry is the potential unavailability of some of these resources or the increased difficulty in mining them. This may have an indirect effect on exploration and development costs, mineral commodity production, and profitability and thus may have indirect effects on the local economy. However, most of the avoidance and exclusion areas occur in the west half of the planning area where there is a moderate potential for the occurrence of geothermal resources and a low potential for fossil fuels and locatable minerals. Owing to these factors and the low historical development and production of leasable and locatable minerals in the planning area, the adverse effects of these restrictions are not expected to be notable.

Alternative 1

The physical effects related to the development of mineral material sites would potentially occur within 396,185 acres open to that use. This alternative has the largest allocation of land open to mineral material sales. Within these open lands, the 29,545-

acre Badlands WSA and the 191-acre Wagon Roads ACEC are designated as avoidance areas. There is no buffer around residentially zoned areas or designated recreation sites, so mining operations have the highest potential for effects on residents and recreational users. Under this alternative, none of the sites proposed by ODOT occur on lands closed to mineral material sales or on lands with restrictions for this use.

Common to Alternatives 2-7
The 29,545-acre Badlands WSA, the 844-acre Tumalo Canals ACEC, and the 16,731-acre ½-mile buffer around the roads in Wagon Roads ACEC are closed to mineral material sales. The unavailability of mineral resources in the Badlands WSA and the Wagon Roads ACEC is assumed to have a minimal economic effect because there are no known high quality mineral material deposits in those areas. However, in the Tumalo Canals ACEC, ODOT identified a locality with high quality aggregate rock with an estimated reserve of over 1 million cubic yards. If comparable alternative source(s) are not found, there could be some effects on the costs, longevity and taxpayer benefit of road construction and maintenance projects in and around the Cline Buttes area. These effects are unknown because the quality and reserves of some other prospective sites in the Cline Buttes area have not been thoroughly evaluated.

On public lands adjacent to residentially zoned areas and/or designated recreation areas, the development of mineral material sites has the potential for adverse effects on residents and recreationists. However, the effects would be somewhat less than those of Alternative 1 owing to the 1/8-mile minimum buffer closed to mineral material sales around residentially zoned areas and designated recreation sites. The buffer around existing residentially zoned areas comprises 14,659 acres.

Alternative 2
The physical effects related to the development mineral material sites would potentially occur within 334,893 acres open to that use. Alternative 2 is the least restrictive of the action alternatives by designating the largest number of acres as open to mineral material sales and having the least number of acres with restrictions. There are no avoidance or exclusion areas specific to this alternative.

This alternative designates the smallest possible buffer (1/8 mile) of the action alternatives around residentially zoned areas and designated recreation sites. Thus, mining has a relatively high potential to adversely affect residents and recreational users under this alternative.

Alternative 3
The physical effects related to the development of mineral material sites would potentially occur within 332,774 acres open to that use. This alternative allocates the same number of acres open to mineral material sales as Alternative 6, but has more acres with restrictions. Within these open lands, the 31,011-acre Juniper Woodlands ACEC and the 4,200-acre Alfalfa Market Road ACEC are designated as avoidance areas. The 2,119-acre Smith Rock ACEC is an exclusion area. No known economic high quality mineral material sites are known within the Alfalfa Market Road or Smith Rock ACECs so the effects of these designations are likely to be minor. However, the Juniper Woodlands ACEC covers much of the Cline Buttes area identified by ODOT (1999) as being highly favorable for mineral material development. The restrictions in this ACEC may require ODOT to utilize alternative sources and there could be some effects on the costs, longevity, and taxpayer benefit of road construction and maintenance projects in and around the Cline Buttes area.

Mining would have the same effects on residents and recreational users as in Alternative 2 due to the 1/8-mile buffer around residentially zoned areas and designated recreation sites.

Alternative 4
The physical effects related to the development of mineral material sites would potentially occur within 321,466 acres open to that use. This alternative has the second least number of acres open to mineral material sales. Within these open lands, the 4,200-acre Alfalfa Market Road ACEC, the 6,756-acre Juniper Woodlands ACEC and the 16,257-acre sage grouse ACEC are designated as avoidance areas. No known mineral material sites occur in these areas so the effects on the mining industry are likely to be small.

The effects of mining operations to recreational users would be minimal due to the ½-mile buffer closed to mineral material sales around designated recreation areas. Adverse effects from mining on residents would be moderate as compared to Alternatives 2 and 3 because of the ¼ mile buffer zone designation around residentially zoned areas. The buffer around existing residentially zoned areas comprises 28,086 acres.

This alternative requires operators to use alternative sources of mineral materials when available within 30 miles of the construction site instead of opening up new sources on BLM-managed land. Due to this requirement, the effects on the costs, longevity, and taxpayer benefit of road construction and maintenance projects planning area wide are likely to be greatest under this alternative.

Alternative 5
The physical effects related to the development of mineral material sites would potentially occur within 297,493 acres open to that use. This alternative is the most restrictive of all alternatives by allocating the least number of acres open to mineral material sales and having the second highest number of acres with restrictions. Within these open lands, the 15,217-acre Peck's Milkvetch ACEC is designated as an avoidance area. This ACEC covers the southwest part of the Cline Buttes area identified by ODOT (1999) as being highly favorable for mineral material development. The restrictions in this ACEC may require ODOT to utilize alternative sources and there could be some effects on the costs, longevity, and taxpayer benefit of road construction and maintenance projects in and around the Cline Buttes area. However, much less of the Cline Buttes area falls under avoidance area designation under this alternative than in Alternative 3.

Adverse effects from mining on residents would be minimal because of the 52,059-acre ½-mile buffer closed to mineral material development around residentially zoned areas. Mining would have relatively minor effects on recreation in parts of the planning area defined as "urban" and potentially larger effects in areas defined as "rural" due to buffer zones of ½ and 1/8 mile respectively.

Alternative 6
The physical effects related to the development of mineral material sites would potentially occur within 332,774 acres open to that use. This alternative allocates the same number of acres open to mineral material sales and has the same ACECs with exclusion area designation as Alternative 3 and has the same ACECs with avoidance area designation as Alternative 5.

Mining would have the same effects on residents as in Alternatives 2 and 3 because of the 1/8-mile buffer closed to mineral material development around residential areas. However, mining would have relatively minor effects on recreation in parts of the planning area defined as "rural" and potentially larger effects in areas defined as "urban" due to buffer zones of ½ and 1/8 mile respectively.

Alternative 7
This alternative is identical to Alternative 6 with respect to mineral material sales except for avoidance areas. The Peck's Milkvetch ACEC is 14,227 acres under this alternative and is 1660 acres smaller than that of Alternative 6.

Cumulative Effects
Site-specific and/or quantitative analyses of cumulative effects are not possible due to the uncertainty of when and where mining operations will be authorized within lands open to that use. However, the cumulative effects of land allocations open to mining can be discussed in general terms.

The allocation of lands open for mineral uses is likely to lead to at least a few mining operations during the life of this plan. The effects of mining including but not limited to ground disturbance, erosion, dust, noise, truck traffic, the spread of noxious weeds and/or conflicts with residents, recreation and natural resources would add to similar effects resulting from other uses of adjacent lands. Other past, present, and future uses that would contribute cumulatively to some or all of the effects of mining operations include but are not limited to grazing, utility corridor construction and maintenance, rights of ways, motorized use (including OHV), recreation, adjacent private land uses and other mining operations.

The reclamation requirements and the designation of avoidance and exclusion areas in this plan will cumulatively add to present and future restrictions on mining. This plan carries forward and adds to the restrictions enacted by the B/LP RMP (1989) and adds to the standard environmental restrictions and requirements listed in the Code of Federal Regulations. Future decisions may add further requirements and/or restrictions on mining in the planning area.

Conclusions
The issues addressed in this plan are similar the issues faced by land use planners and the aggregate mining industry nationwide. Across the U.S., rapid urbanization of the landscape has resulted in more demand for mineral materials while leaving less space for mining and other uses such as agriculture and recreation (Langer, 2002; Arbogast *et al.*, 2000). Many important mineral material sites conveniently located within close proximity to population centers have been made inaccessible by suburban development (Kesler, 1994). Moreover, people want affordable housing, driveways, bridges, and well-maintained roads and highways yet many oppose the development of aggregate mines, especially in close proximity to where they live. These factors coupled with environmental concerns have made permits increasingly difficult to obtain for aggregate mining (Arbogast, *et al.*, 2000). Cities across the U.S. are facing shortages and/or inflated costs of aggregate due to increased haul distance. In some parts of the U.S., land-based sources of aggregate are no longer available and the continental shelf is being dredged to meet the demand for aggregate materials (Kessler, 1994). Although the communities of Upper Deschutes planning area may face increased costs due to restrictions and the unavailability of some sites on BLM-administered lands, there appears to be enough mineral materials from public and private sources to meet the foreseeable future demand.

Although some known and unknown mineral material deposits fall within avoidance oar exclusion areas or fall under other restrictions, there are adequate public and private aggregate reserves to meet the expected demand over the next 20 years. According to DOGAMI (1995) forecasting models, Deschutes County is expected to consume 2.4 million cubic yards of aggregate for all uses including road construction and maintenance between 2001 and 2020. The estimated reserves from existing aggregate sites identified by ODOT (1999) as having "good" to "excellent" quality or as meeting ODOT specifications add up to 22.4 million cubic yards. This figure excludes at least 13 other sites for which the reserves and/or quality are not available. Given that the known estimated reserves are 9.3 times larger than the expected 20-year demand for Deschutes County and that most of the population centers are in Deschutes County, it is assumed the reserves are adequate to meet the demand throughout the entire planning area for the life of the plan.

There are areas with moderate to high potential for the occurrence of geothermal energy, oil and gas, and locatable minerals. However, based on historical mining exploration and production, notable development of locatable and leasable minerals within the planning area is not expected to occur in the next 10-20 years. Thus, the effects of the restrictions in the alternatives on the mining and energy industries are not expected to be notable. Similarly, the environmental and social effects from the development of these resources are not expected to be important.

Effects and Effectiveness of Mitigation Measures
Mining effects on residents and recreational users, such as dust, asphalt batching odor, and noise are mitigated by buffer zones surrounding residentially zoned areas and designated recreation sites. Mineral material sites are not allowed within the buffer zones. The effectiveness of the buffer zones varies by alternative because the width of the buffer zones varies between 0 and ½ miles through the alternatives. Thus, the difference in effectiveness between the buffer zones would only apply to mines located less than or equal to ½-mile from residentially zoned areas or designated recreation sites. For example, the noise intensity heard by a person ½ mile from a mine would be four times less than that heard by a person ¼ mile away and sixteen times less than that heard by a person 1/8 mile away. The effectiveness of the buffer zones is also affected by wind direction. Buffer zones located upwind from a residential or recreation area will be less effective at mitigating dust and asphalt batching odor than buffer zones located downwind.

In Alternatives 2-7, mining-related dust and noise from mineral material sites is mitigated by stipulations prohibiting mining activities on legal holidays and restrictions on the hours of operation and hours when blasting is allowed. Assuming operator compliance, mining operations including blasting and truck traffic will not affect residents and recreational users at night, early in the morning, or on legal holidays.

The effects of mining-related truck traffic on residents and recreational users are mitigated in alternatives that allow no more than a moderate conflict with residents and/or recreation. Under low or moderate conflict scenarios, mining-related truck traffic may not cross-designated recreation trails or use roads that feed from BLM-administered lands into residentially zoned areas. These mitigation measures would notably reduce the exposure of residents and recreational users to mining-related traffic on and from BLM-administered lands.

All alternatives require ground-disturbances resulting from the mining of locatable minerals and mineral leasing to be reclaimed. Alternatives 2-7 extend the reclamation requirements to common variety mineral materials (saleable minerals). The success and effectiveness of reclamation is site-specific and depends on factors such as geology, geochemistry of waste rock, topography, funding from reclamation bonds, operator compliance, and the type, size, and scale of operations. No reclamation effort can mitigate 100 percent of the ground-disturbing effects of mining. However, reclamation can substantially reduce the visual and environmental effects resulting from a mining operation. Because the location and condition of future mining sites under this plan are unknown, the true effectiveness of the reclamation requirements cannot be determined.

All of the mitigation measures act to reduce mining conflicts with residents, recreation, and natural resources. Thus, these measures will either have positive effects or lessen the adverse effects of mining on other land uses and values. In contrast, the mining industry will have less BLM-administered land available for mining and will face more obligations to protect special values and reduce conflicts (see Table 4-17 for acres available to mineral entry by alternative).

Table 4-17. Acres available to mineral entry by alternative.

Indicator	Alt 1 (acres)	Alt 2 (acres)	Alt 3 (acres)	Alt 4 (acres)	Alt 5 (acres)	Alt 6 (acres)	Alt 7 (acres)
Locatable Minerals							
Open to locatable mineral entry	**403,910**	**403,910**	**403,910**	**403,910**	**403,910**	**403,910**	**403,910**
Avoidance Areas	**34,319**	**51,216**	**88,546**	**78,429**	**62,360**	**64,479**	**61,370**
Mineral Leasing							
Open to mineral leasing	**374,365**	**374,365**	**374,365**	**374,365**	**374,365**	**374,365**	**374,365**
No Surface Occupancy	**21,254**	**38,151**	**75,481**	**65,364**	**49,295**	**51,414**	**48,305**
Avoidance Areas	**4,774**	**21,671**	**59,001**	**48,884**	**21,671**	**34,934**	**31,825**
Mineral Sales							
Open to mineral sales	**403,910**	**342,108**	**339,989**	**328,681**	**304,708**	**339,989**	**342,108**
Avoidance Areas	**34,319**	**4,073**	**39,284**	**31,286**	**15,217**	**15,217**	**14,227**

Rockhounding

Summary

The direct effect of the allocation of lands open to rockhounding is the availability of petrified wood and semiprecious gemstones on those lands for collection. Indirect effects including the permanent removal of rock materials, ground disturbance, damage to vegetation, contributions to the spread of noxious weeds, off-road motorized use, human waste and littering would likely occur. However, these effects cannot be quantified owing to the lack of data on use levels and the potential for rockhounding in areas not known to the BLM. Because the popular and heavily used rockhounding localities are available in all alternatives, the environmental effects from this use are expected to the same through all alternatives.

Acreages available for rockhounding by alternative are shown in Table 4-18. Alternative 1 has the most acreage available for rockhounding and designates 5 collecting sites (Map 13 in the Brothers/La Pine RMP, 1989). Alternative 3 has the least number of acres available and Alternatives 2-7 designate 4 rockhounding sites (Maps S-20 – S-28). The rockhounding sites that are de-designated in Alternatives 2-7 are not being closed to rock collecting; they will no longer be managed as rockhounding recreation sites. Moreover, the various special management areas that are closed to rockhounding through the alternatives generally do not have any rock materials of rockhounding significance. Because the important rock material deposits of rockhounding interest are available in all alternatives, the environmental effects from this use are expected to be essentially the same through all alternatives.

Assumptions

Based on the promotion by individuals, groups, internet sites, rock shops, publications and the media, it is assumed that traditional rockhounding sites on BLM-administered lands within Crook County will remain popular and continue to be used. Sporadic

Table 4-18: Acres available for rockhounding.

Alternative	Acres Available for Rockhounding
1	401,849
2	366,888
3	331,677
4	355,932
5	355,744
6	355,744
7	356,734

collecting of petrified wood, semiprecious gemstones, and other rock materials from smaller isolated deposits is also expected to occur.

The Wagon Road, Tumalo Canals, Alfalfa Market Road, Badlands, and Peck's Milkvetch ACECs and the Horse Ridge and Powell Butte RNAs would be closed to rockhounding. It is assumed based on geology and the historical lack of rockhounding interest that these special management areas generally have few or no rocks of rockhounding significance.

Incomplete/Unavailable Information

Not all of the planning area has been inventoried for rock materials of rockhounding significance; the available data are only from known rockhounding sites. Moreover, there is no data on the frequency of use or the quantity of material collected at known sites. Therefore, the number of locations and the total area affected by rockhounding cannot be quantified.

Analysis of the Alternatives

Common to All Alternatives
The North Ochoco Reservoir, Eagle Rock, and the part of the Fischer Canyon site east of Hwy 27 will continue to be managed for rockhounding uses.

Due to the potential existence of rockhounding sites unknown to the BLM, the potential discovery and subsequent use of new sites in the future, and the lack of data on the frequency of use of known sites, the effects of continuing to allow rockhounding within the planning area cannot be quantified. Therefore, the effects related to rockhounding will be discussed qualitatively.

The direct effect of the allocation of lands open to rockhounding is the availability of petrified wood and semiprecious gemstones on those lands for collection. Indirect effects including the permanent removal of rock materials, ground disturbance, loss of and damage to vegetation, contributions to the spread of noxious weeds, off-road motorized use, human waste and/or littering would likely occur. These effects would most likely occur on and around the three well-known rock hounding sites in the planning area, the Carey Agate Beds, North Ochoco Reservoir, and Eagle Rock sites. However, less important petrified wood and semi-precious gemstones also occur in isolated deposits throughout the planning area east of Powell Butte. Such areas might be impacted to various degrees contingent upon discovery and how popular they become.

The designation of special management areas as exclusion areas with respect to rockhounding would have minimal effects on recreational rock collecting. None of the

three well-known rockhounding sites within the planning area would fall within any exclusion areas under any alternative. Moreover, there are generally few or no materials of rockhounding significance in any of the exclusion areas.

The discontinuance of managing the Fischer Canyon site for rockhounding would lessen the potential for the loss of scientifically important paleontological resources.

Cumulative Effects
The ground-disturbing effects of rockhounding would cumulatively add to similar effects resulting from other past, present, and future land uses and activities. These include but are not limited to ground disturbances from mining operations, grazing, utility corridors, development of rights of ways, adjacent private land uses and developments, and recreation including motorized uses such as OHVs.

Conclusions
The well-known Carey Agate Beds, North Ochoco Reservoir, and Eagle Rock rockhounding sites (Maps S-20, S-21) would probably receive most of the rockhounding use during this planning cycle. These sites have been developed with mechanized equipment and/or explosives at various times in the past when they were held under mining claims. These actions created relatively large ground disturbances from quarry-scale removal of rock. Continued use of these sites by rockhounds with hand tools is not expected to notably add to the existing ground disturbances. Other less known or soon-to-be discovered sites might be impacted with new ground disturbances and the indirect effects described above.

The rock materials of rockhounding interest within the planning area are common throughout the U.S. and the world. Chalcedony is a general term for varieties of cryptocrystalline quartz including agate, onyx, bloodstone, flint, chert, jasper, and petrified wood. All 50 states produce at least some types of chalcedony (USGS, 2002). States with notable localities and types of chalcedony include Alaska, Arizona, California, Colorado, Florida, Idaho, Montana, New Mexico, Oregon, South Dakota, Tennessee, Texas, Washington, Wyoming and Utah. Owing to the overall abundance of chalcedony, the recreational removal of chalcedony materials from BLM-administered lands within the planning area is expected to have a negligible effect on this resource in terms of quantity.

The John Day and Clarno formations (see geology discussion) represent part of the most complete record of Tertiary plant and animal populations in the world and preserve remarkable evidence of North American climate change (Fremd *et al.*, 1994). Petrified wood and botanical fossils from the Clarno and John Day formations are present in various localities not closed to rockhounding. Due to the scientific importance of these formations, the collection of petrified wood and botanical fossils could degrade the scientific value of some localities.

Effects and Effectiveness of Mitigation Measures
There are mitigation measures to minimize damage to the environment, hazards to health and safety, illegal commercial use and excessive personal use. Rock collectors are not allowed to dig in stream channels, undermine trees, dig non-vertical holes so as to create a tunnel or an overhang, or dig holes deeper than four feet. All holes must be filled in by the rock collectors that create them. Up to 50 pounds of rocks may be collected per person per day and not to exceed 500 pounds per year.

The effectiveness of these mitigation measures depends on public awareness, compliance, and enforceability. These factors are not known or predictable so the true effectiveness cannot be determined prior to implementation.

Oregon Military Department Use

Summary

The goal is to provide for the Oregon National Guard's training needs through a land use agreement between the BLM and the Oregon Military Department (OMD), to allow long-term (30-year) use and occupancy of federal public lands in Central Oregon. This is a continuation of long-term use, established in 1942 by the Military, for training purposes. Continuation of long-term use would be subject to periodic review of both the National Guard and BLM's standards and guidelines and review and monitoring of the National Guard's performance in meeting standards and guides.

In all alternatives, the decision to be made is one of lands allocation for military training activities. There are basically three lines of thought with regard to allocating lands for military uses in the planning area. (1) The general location and size currently allotted are working well, only minor changes are needed as in Alternatives 1 and 5. (2) Confine the Military to the smallest training area needed to conduct training activities, dedicating the public lands as a sacrifice area as in Alternatives 3 and 4. (3) Broaden the area permitted for training to maximize the time between training exercises on specific parcels, and partner with the Military to pool resources and rehabilitation funds to assist BLM with its resource responsibilities as in Alternatives 2 and 6.

Table 4-19 compares by alternative the number of acres of BLM-administered lands on which military training would be permitted.

Assumptions

In all alternatives, resource rehabilitation and protection activities in the training area would become more pro-active as new military requirements are initiated.

Development of private lands, including the Pronghorn Destination Resort, is increasing the public use in the western portion of the currently permitted military training area. In Alternative 1, the Military would continue to avoid potential conflicts by concentrating training to the eastern side of the training area.

Alternative 2, as with Alternative 1, would move much of the training away from the western portion of the training area. For training purposes, the North-South long strip alignment would provide for troop movement so that training may continue in stages. This alternative would provide an opportunity to spread training over a broader area, not concentrating uses, providing more time for rehabilitative efforts to be successful.

Table 4 - 19. Amount of BLM-administered land in the planning area dedicated to military training, by alternative.

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres	29,744	36,397	21,207	26,194	29,760	55,665	50,600
Percent of currently permitted area	100%	122%	71%	88%	100%	187%	170%
Percent of planning area	7%	9%	5%	6%	7%	14%	13%

In Alternative 3, the same areas would be used more often per year; consequently, the same resources would be integrated into training exercises more often. Rehabilitation efforts would be more intensive, and concentrated in a smaller area. The larger training activities may simply not fit into the smaller area or, if permitted, the modifications necessary may be unacceptable for military purposes.

In Alternative 4, the same areas would be used more often per year; consequently, the same resources would be integrated into training exercises more often. The uses, however, would be less concentrated than in Alternative 3. Alternative 4 would avoid conflicts with Pronghorn Destination Resort through avoidance by not permitting training in the general area. Rehabilitation efforts would be more intensive, and concentrated in a smaller area. The larger training activities would probably have to be modified.

Alternative 5 would reduce conflicts by excluding the area around the Pronghorn Destination Resort. For training purposes, a long North-South strip alignment for troop movement would provide for training in continuous stages, which is a desirable training scenario. Rehabilitation efforts would be at the same levels as Alternatives 1 and 2.

In Alternative 6, the permanent training area is the same as Alternative 2. Alternative 6 would move training away from the western portion of the training area for the reasons cited above in Alternative 1 and 2. For training purposes, a long North-South strip alignment for troop movement will provide for training in continuous stages, which is a desirable training scenario. This alternative would provide an opportunity to spread training over a broader area rather than concentrating use, and could provide more time for rehabilitate efforts to be successful.

The rotational areas would decrease uses in the permanent training areas, spreading uses over putting fewer uses in the resources in the course of a year. Military personnel would have different areas in which to train, improving the training experience. Resource protection, rehabilitation, and improvement funds could be spread over a broader area.

Alternative 7 is the same as Alternative 6 except that training in Area A would not be permitted from the BPA powerline south to Powell Buttes Highway.

Analysis of the Alternatives

Alternative 1
The land allocated for military training is the same as is currently permitted. Development of private lands, including the Pronghorn Destination Resort, is increasing the public use in the western portion of the Military permitted area. The Military will seek to avoid potential conflicts, and would concentrate training to the eastern side of the training area.

Alternative 2
As with Alternative 1, this alternative would move much of the training away from the western portion of the training area. For training purposes, the North-South long strip alignment would provide for troop movement so that training may continue in stages. This alternative would provide an opportunity to spread training over a broader area, not concentrate uses, and provide more time for rehabilitative efforts to be successful. The Military would probably replace the training currently done west of the North Unit Canal to the area north of Highway 126 to avoid conflicts with the subdivisions and destination resorts.

Use of the area north of Highway 126 would begin and increase while use west of the North Unit Canal would diminish. Monitoring and rehabilitation would redistribute in conjunction with the changes in use.

Alternative 3
Military training would be constrained to the least area needed to accomplish the training objectives. Training levels would remain the same, so the same ground would be crossed more times yearly. Rehabilitation would occur continuously over the same area. Rehabilitation may be impaired because there may not be sufficient time between entries for the efforts to be successful; hence, the quality of the resource would be reduced. This may be setting the rehabilitation efforts up for failure over time. In so doing, the permitted area could become a sacrifice area.

In an effort to spare the resource, installation of permanent facilities such as site hardening might be a condition in the lease. Site hardening would involve installation of permanent use facilities, such as bivouac (camping) sites, to replace dispersed uses.

Hardening sites would reduce the area available for other resource uses. For the soldier, knowing the ground and having pre-selected sites would reduce the effectiveness of the training. A complete system of hardened sites reduces the realism of the training.

The larger training activities may simply not fit into the smaller area or, if permitted, the modifications necessary may be unacceptable for military purposes.

Alternative 4
Consequences of Alternative 4 would be similar to Alternative 3 except the uses would be less concentrated than in Alternative 3. The training area west of the North Unit Canal and south of Pronghorn Resort would be little used or unused by the Military because of the close proximity to developments and the lack of access roads including a ready transportation system to the east side training areas. There is no military canal crossing to the west side of the North Unit Canal and no transportation system that complements their training program so training use would decline or stop. Rehabilitation efforts would be more intensive, and concentrated in a smaller area. The larger training activities may be modified.

Alternative 5
Uses would be roughly the same as in Alternative 1 except for the training area on the west side of the North Unit Canal. For the same reasoning as in Alternative 4, training use in this area would decline or stop. For training purposes, a long North-South strip alignment for troop movement would provide for training in continuous stages, which is a desirable training scenario. Rehabilitation efforts would be at the same levels as Alternatives 1 and 2.

Alternative 6
The permanent training area would be the same as Alternative 2 and 5. Alternative 6 would move training away from the western portion of the training area for the reasons cited above in Alternative 1 and 2. For training purposes, a long North-South strip alignment for troop movement would provide for training in continuous stages, which is a desirable training scenario. This alternative would provide an opportunity to spread training over a broader area, reducing concentration of uses, and providing more time for rehabilitate efforts to be successful.

The rotational use of 3 new areas would decrease uses in the permanent training areas, spreading uses over the course of a year. Military personnel would have different areas in which to train, improving the training experience. BLM and the Military estimate that training would occur about 5 to 7 days per year in the rest rotation areas, which would reduce the time training on the traditional area to 9 to 7 days on average.

Resource protection, rehabilitation, and improvement funds could be spread over a broader area. The Military would be able to perform a civil/community service by

assisting BLM in deterring vandalism, restoring native plants and soil condition, and cleaning up dumping on these parcels included a broader area through inclusion of the rotational areas. Funding would be made available for rehabilitation where it would otherwise not be. The concentration of military training on the traditional training area would be reduced.

BLM and the Military speculate that training would occur about 5 to 7 days per year in the rest rotation areas, which would reduce the time training on the traditional area to 7 to 9 days on average.

For the Military, the training experience for the soldier improves when they train in areas where they are unaccustomed to the terrain.

Alternative 7
Same as Alternative 6.

Visual Resources

Summary

Decisions within the scope of the UDRMP that may directly or indirectly affect visual or scenic quality include the allocations, objectives, and guidelines for travel management, managing vegetation, fire and fuels treatment, rights-of-ways and transportation, and wildlife habitat restoration. In general, visual resource impacts are evaluated at a project specific scale by considering the degree of change or contrast created with the characteristic landscape. Activities that cause the most contrast and are the most noticeable to the viewer are generally considered to have the greatest effect on scenic quality. Most of the affects described here are described in terms of potential for effects, because many of the potential activities described below are likely to be implemented during the life of the plan, but are not specifically analyzed or authorized in the UDRMP EIS.

Assumptions

Some of the basic assumptions used in evaluating visual impacts of the alternatives include:

1. There are different levels of concern about scenic quality depending on the intrinsic qualities of the landscape being viewed, the expectations of the viewer, and the conditions under which the landscape is seen (e.g., the distance of view)
2. High quality scenery, especially that related to natural-appearing landscapes, enhances people's lives and benefits society.
3. Planning area wide, existing scenic quality is a function of visual diversity. The major components of scenic quality are prominence or uniqueness of landforms, presence of water as part of the landscape view, and presence of adjacent scenery (outside BLM jurisdiction) that enhances visual quality. For a more detailed description of the criteria used in developing VRM Classes, see Appendix H, Visual Resource Inventory Process.

Many of the potential effects to scenic quality are based on the assumptions that the recreation goals in the action alternatives (2-7) are implemented, and that visitors to BLM-administered lands, will generally have equal or higher expectations for scenic quality than at present. While the management standards for visual quality (i.e., Visual Resource Management Classes) are the same throughout alternatives 2-7, even when VRM Classes are met during management activities, there will be some impacts to scenic quality, particularly for visitors to, or residents living next to, BLM-administered lands.

These impacts may include changes in vegetative patterns, species type, or residue from vegetative treatment. These changes may reduce scenic quality when seen in the immediate foreground (1/4 mile or less).

An additional assumption is that project specific mitigation to address visual quality concerns over much of the planning area will be in part dependent on the designation of road and trail systems occurring before large scale vegetative treatments (mechanical treatments, thinning, prescribed fire, WUI treatments) are undertaken. Without a clear understanding of the transportation system, it will be unlikely that mitigation can be designed into projects to reduce or avoid both short and long-term visual impacts to viewers on these roads and trails. For the purposes of this analysis, it is assumed that most of the vegetative treatments will occur prior to the final establishment of designated road and trail systems; thus, opportunities for project specific mitigation will be low.

The evaluation of visual impacts of alternatives is also based on the assumption that for many viewers, vegetative conditions that do not represent a historic range of variability will appear more "natural" than managed conditions that mimic natural ecological processes and move toward a historic range of variability. Visitors and residents may view the current, vegetative condition of juniper forest to be the norm. The transition from juniper stands to shrub steppe vegetation, or to a fire influenced vegetative condition, while more in keeping with historic conditions, may be viewed as more unnatural, especially when accompanied by obvious human elements such as stumps, brush piles, etc.

The analysis is also based on the assumption that fuel reduction/fire hazard treatments (WUI treatments) would occur both in Alternative 1 and Alternatives 2-7, at nearly the same level, based on current BLM policy direction.

Given the high growth and development rates throughout much of the planning area, it is assumed that BLM lands will increase in importance as an open space backdrop to a developing area. As stated in the AMS, rural, agricultural, and ranchland plays a role in defining the area's character and providing pastoral, scenic views. However, as the area continues to grow, some of this land will become more densely developed. For the purposes of this analysis, transfer or sale of BLM-administered land and subsequent development is considered a negative effect on the area's visual resources.

Under all action alternatives, the assumption is that management activities will meet VRM Classes, and that opportunities exist to meet ecosystem management goals while avoiding highly apparent contrasts with the characteristic landscape.

For all alternatives, VRM Classes provide a baseline set of management objectives. Regardless of what VRM Class designations are applied, all alternatives provide some meaningful measure to apply BLM's contrast rating methodology to assess impacts to visual resources at a project specific level for all surface-disturbing activities.

The surface disturbing activities that may affect scenic quality in the planning area include vegetation clearing, burning, WUI treatments, road and trail construction, utility line ROW development or upgrades, etc. These impact visual resources by changing vegetative patterns, species composition, change landform shape, texture or color, or introduce non-natural features that provide contrast with the surrounding landscape character.

The severity of an adverse visual effect depends on a variety of factors, including the size of a management action, the location and design of roads and trails, the treatment of residue or slash from vegetative harvests or mechanical treatments, and the overall visibility of disturbed areas.

In some cases, vegetative clearing can improve visual quality by opening pleasing views, or by softening or blending of contrasting vegetative boundaries caused by development or past management practices, particularly on steep slopes or prominent landforms.

Analysis of the Alternatives

Visual Resource Management Classes
Alternative 1 would manage most of the planning area as VRM Class 3 and 4, with the North Millican, Millican Plateau, and Skeleton Fire areas being managed for a relatively low concern for visual quality (VRM Class 4). The area surrounding Prineville Reservoir, BLM-administered lands atop Powell Buttes, and isolated parcels surrounding Prineville would be managed for a higher visual quality standard (VRM Class 2). All alternatives would manage the Badlands and Steelhead Falls WSAs and the Horse Ridge RNA for the greatest emphasis on scenic quality (VRM Class 1).

The major differences in management direction between Alternative 1 and the action alternatives is the movement away from an overall VRM Class 3 applied to the western half of the planning area. While Alternative 1 applies a moderate VRM Class 3 to most BLM-administered lands west of the Powell Butte Highway, Alternatives 2-7 provide a higher scenic quality standard (VRM Class 2) for portions of this area with special characteristics (i.e., buttes that form community backdrops, dry canyons, etc.), while also dropping overall Class 3 rating to a lower standard (VRM Class 4) for most of the flatter portions of this area that are not visible from Key Observation Points.

For the eastern portion of the planning area, the action alternatives raise the scenic quality standard from VRM Class 4 to Class 3 for areas such as the Smith Canyon and West Butte areas, particularly to reflect views from the upgraded Millican/West Butte Road. The viewshed of Prineville Reservoir retains the existing high standard for scenic quality (VRM Class 2), although the action alternatives place this designation only on the viewshed as seen from the reservoir surface, while Alternative 1 places this standard on a much larger area not visible from the reservoir itself.

Table 4 - 20. Shows the general VRM Classes apply to certain areas. The predominant VRM Classes are listed for each area, with the most prevalent Class being listed first.

Indirect Effects

Vegetation and Wildlife Habitat Restoration
Alternative 1 has the least potential impact on visual quality based on vegetative and wildlife habitat restoration. This alternative calls for approximately 71,000 acres (17.5 percent) of the planning area to be treated (thinned, prescribed fire, mechanical treatment) over a 15-year period. In contrast, Alternatives 2, 4, and 5 would more than double this acreage to about 170,000 acres (approximately 40 percent) of the planning area over a 15 year period. While the opportunity to mitigate impacts to scenic resources would be available for moderate to long distance views in most places, there would still be relatively widespread potential for visual impacts for adjacent landowners and public land visitors due to these treatments, because of the introduction of non-natural appearing conditions such as stumps, fallen trees, brush piles, scattered slash, burn piles etc. Alternatives 3, 5, 6 and 7 have the highest potential to cause impact to visual resources, as the treatment acres increase to 230,250 acres (57 percent) of the planning area over a 15-year period. Again, while the opportunity to mitigate VRM Classes for moderate to long-distance views would be available (and in many cases these treatments may increase visual quality through increased diversity or opening up views), there would be impacts to both residents and public land visitors due to the scale of these treatments and the resulting changes from a natural appearing setting to an intensively managed setting when viewed close up. Opportunities for mitigating these impacts are limited due to the lack of final designated road and trail systems throughout most of

Table 4-20. VRM Classes by Geographic Area and Alternative

	Alternative 1	Alternatives 2-7
Badlands WSA	Class 1	VRM Class 1
Bend-Redmond	Class 3	VRM Class 4
Cline Buttes	Class 3	VRM Class 2, 4
Horse Ridge	Class 2,3, 4	VRM Class 2,3,4
La Pine		VRM Class 4,3
Mayfield	Class 3	Class 3
Millican Plateau	Class 4,3,2[1]	Class 4,3,2[1]
North Millican	Class 4,3	Class 3,4
Northwest	Class 3	Class 4
Prineville	Class 2	Class 4
Prineville Reservoir	Class 2,3	Class 2,4,3
Smith Rock	Class 2	Class 2
South Millican	Class 3, 4	Class 4
Steamboat Rock	Class 3,2	Class 4,2
Steelhead Falls WSA	Class 1	Class 1
Horse Ridge ACEC/RNA	Class 1[2]	Class 1[2]

1. Both alternatives place the majority of the area as Class 4, with the Lower Crooked River corridor as Class 2. Alternative 1 identifies the western part of Millican Plateau as Class 3, while Alternatives 2-7 identify the foreground view of Millican/West Butte Road as Class 3 instead.
2. Horse Ridge ACEC/RNA is part of the Horse Ridge geographic area. It is shown separately on this table to illustrate that its VRM Class is common to all alternatives.

the planning area. However, if project planning for vegetative treatments are done at the same time as road and trail planning, there would be greater opportunity to address project specific visual resource concerns.

Roads and trails

Alternative 1 leaves much of the planning area open to cross-country vehicle travel, and does not provide some basis for reduction of road density and braided road/trail networks. In Alternatives 2-7, the movement towards fewer and more highly managed access points, and development of a designated road network would improve visual quality throughout the planning area. Many areas currently have upwards of 50 separate motorized access roads and currently contain extensive road networks of up to 8 or more miles of road per square mile. The change from dense, confusing, and braided road networks to a more managed condition that is somewhat natural appearing would provide an increase in visual quality for all areas, regardless of VRM Class designations. Alternatives 2-7 also provide direction for rehabilitating/restoring hillclimbs in highly visible locations such as Horse Ridge, Cline Buttes and Steamboat Rock.

WUI treatments

WUI treatments would have about the same level of potential effects on visual resources for all alternatives. These impacts would be greatest for public land visitors and adjacent residents who have an immediate, close range view of treated areas. In some cases, the WUI treatments may improve visual quality by opening up views or reducing the contrast between heavily wooded BLM and adjacent private land that is thinned or cleared. The greatest potential for visual effects from WUI treatments would occur in

locations where the thinning/clearing would highlight the linear nature of the BLM/Private boundary, especially when visible on prominent landforms that form community backdrops. These potential impacts are greatest in VRM Class 2 and 3 areas that are highly visible due to prominence of landforms or high degree of recreation use. These areas would include portions of the Smith Rock area, canyon and upper slope portions of Cline Buttes, areas surrounding the Wagon Roads ACEC, Powell Butte, portions of West Butte, and portions of the viewshed of Prineville Reservoir. WUI/vegetation treatments in these areas would be assessed a project level scale to ensure that VRM Classes are met; and in many of these cases, careful project design may minimize the visual effect of these WUI treatments.

In all alternatives, WUI treatments have the potential to significantly affect the visual resources associated with VRM Class 1 areas (i.e., WSAs). In particular, the Steelhead Falls WSA is located in a WUI zone. In this case, it is assumed that the VRM Class 1 standard will be met and WUI treatments in this area may be replaced with hazard reductions on private lands instead.

Land Tenure/Community Expansion lands
Land tenure designation Z-3 and Community Expansion lands are the two planning designations that provide conditions for the most likely sale or disposal of BLM-administered lands. For the alternatives, when the acreage of these two designations are combined, Alternatives 1 and 2 have the highest potential for loss of open space lands through disposal of Z-3 or development of Community Expansion lands (see Table 4-21). Alternatives 3 and 6 have relatively small amounts of BLM land intended for disposal, and the Community Expansion lands for these alternatives have stipulations that require their use as parkland/open space. Alternative 7 retains the same type of stipulation as 3 and 7, but for a smaller area only located along State Highway 97 between Bend and Redmond.

However, the actual disposition of Z-3 lands is based on many variables, and it is unclear how many, if any of these lands would actually be disposed of over the period the UDRMP applies. Most of the Z-3 lands, as well as the Community Expansion lands, are located in areas that do not have high scenic quality; however, they would generally represent a change in character from naturally appearing open space to development if disposed of.

Although Alternatives 3, 5, 6, and 7 provide for the least potential transfer of BLM-administered lands, Alternatives 3, 6, and 7 represent the greatest potential for change in vegetation types and active vegetative treatments (see Vegetation and Wildlife Habitat Restoration, above). The scale of the possible vegetative treatments makes them a greater potential factor in visual quality than the land ownership designations.

Table 4-21. Z-3 and Community Expansion lands (acres) by Alternative.

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Z-3	15,422	12,639	7,456	9,669	7,821	5,107	5,107
Community Expansion	5,617	7,592	3,121	8,512	5,776	5,115	9,889
Total	21,039	20,231	10,577	18,181	13,597	10,222	15,096

Cumulative Impacts
As stated in the assumptions section of this assessment, the population growth and increased development in the planning area will likely both increase the sensitivity of the public regarding visual quality and increase the importance of BLM-administered lands as an open space backdrop to local communities. The increased recreational use of BLM-administered lands through the implementation of the UDRMP will also increase the sensitivity of the public towards the visual quality of BLM-administered lands.

Recreation

Summary/Assumptions

Recreation opportunities on BLM-administered lands are affected by many different factors and decisions in the UDRMP. Plan decisions that directly affect recreation include the recreation allocations made in the plan, including travel management designations, goals and objectives for motorized and non-motorized trail development, and decisions made on how group use and special recreation permits are authorized and managed. Plan decisions on designation of ACECs, transportation management, wildlife habitat management/restoration, may also have a direct affect on recreation opportunities. Other actions proposed in the plan have an important, but indirect effect on recreation opportunities. These indirect effects include designation of most of the planning area as a Special Recreation Management Area (SRMA), use of R&PP Leases to provide recreation opportunities, and plan goals for education, interpretation and partnerships.

The discussion of direct, indirect, and cumulative effects of the various alternatives on recreation opportunities are based on many assumptions concerning BLM's management ability, traditional role as a recreation provider, the availability or capability of other recreation providers in the region, population growth, and demographic changes. The alternatives were developed based partially on the following assumptions, which are also considered in the analysis of effects:

1. Recreation demand will increasingly mirror community needs and organization. Requests for event and commercial recreation permits will increase as more community groups, clubs, and commercial and educational organizations rely on BLM lands that offer easy access on a daily basis.

2. All types of recreation use will increase over the length of the planning period. Winter trail use will continue to be a critical demand in the planning area, for both motorized and non-motorized use.

3. BLM will increasingly seek funding from outside sources for development of both motorized and non-motorized trail systems. BLM will increasingly rely on community groups and volunteers to implement management strategies, and this may affect where implementation efforts are concentrated.

4. The long-term success of recreation management goals is dependent upon completion of area-specific recreation plans for many areas such as Millican Valley, Cline Buttes, Steamboat Rock, Mayfield, etc. Without completion of area-specific plans, recreation opportunities in these areas will be limited, the quality of recreation facilities will be low, and user conflicts will likely increase.

5. Implementation of recreation management goals would be done in a phased approach, with some areas receiving further subsequent planning and stronger implementation efforts than others. Some areas will receive little, if any, management attention. BLM staff and resources will be challenged to provide intensive management for many geographic areas simultaneously. Currently, recreation

management emphasis is placed on the Millican Valley OHV area and the Badlands and Steelhead Falls WSAs. Plan direction for intensive management of many other areas will be extremely difficult to implement.

6. BLM will increasingly be placed in a transition role as a recreation provider, with resources oriented toward wildland recreation during a period of increasing demands for highly managed, more developed recreation settings. The demand for R&PP leases of BLM-administered lands to provide for community recreation facilities will increase as the region's population continues to grow.

7. Providing managed access and designated road systems will provide higher quality recreation opportunities; however, this potential increase in quality is dependent on engineering and maintenance levels. Poorly done or inadequate facility design or access management will create additional user created roads as visitors bypass closures or poorly maintained roads/trails to maintain historic access or behaviors.

8. Declining disposable leisure time among those still in the workforce may create and increase demand for recreation activities closer to home.

9. The demand for motorized trail opportunities is particularly dependent on large blocks of land that offer all day riding or weekend long riding opportunities while avoiding crowded conditions. User satisfaction increases with an increase in trail miles and the number of loop opportunities, because it offers the ability for more riders to use the trail system at one time without encountering each other.

10. Although large blocks of land are important for providing motorized trail opportunities, there is also a need for motorized trail opportunities relatively close to urban areas. These areas may need more intensive management than areas further away from urban growth boundaries.

11. Areas that offer topographic variety offer better quality trail use opportunities for the majority of trail users than predominantly flat areas. Areas that offer a variety of vegetation types, with some degree of shade provided by trees, offer better quality trail use opportunities than areas with uniform vegetation and little or no shade. Areas that are unfragmented by paved roads, major subdivisions, railroad lines, or other barriers provide better trail opportunities for most users.

12. The planning area will continue to be a destination for motorized trail use, with many visitors coming from the western portion of the state or from more distant locations to utilize designated trail systems.

13. The designation of identifiable management areas based on public land blocks, major topographic features or major road boundaries will result in more effective plan implementation and public understanding of regulations than boundaries based on indistinct, unrecognizable management boundaries (e.g., section lines).

14. The management of areas with separate trails systems for motorized and non-motorized users will require a higher level of management intensity, and given the lack of recreation resources, will continue to have a high degree of user conflicts and lower quality of recreation experience.

15. The road system in all areas designated as "Limited" will be revised to provide recreational and administrative access. Local roads to be used as part of the designated system will be identified through area-specific planning. Local road closures would generally not be done outside of an overall area-specific planning effort.

16. The need for non-motorized trails will continue to increase, particularly trail opportunities relatively close to urban or residential areas. As the popularity of these areas increases, user conflicts (between and among recreation user groups) will likely result in recreationists either creating new trail opportunities in these areas or moving to less used, more outlying areas.

17. The Badlands and Steelhead Falls WSAs will increase in popularity. Until Congressional decisions are made on wilderness designation for these areas, the interim management policy leaves BLM with little ability to revise or create a well functioning road/trail system in these areas.

18. Alternatives with an increased emphasis on vegetation manipulation, particularly on mechanical vegetation treatments, will likely reduce recreation quality, at least over the short-term, due to changes in visual character or removal of juniper trees, which provide screening and shade, help define trails, etc.

19. Diversity of recreation opportunities is dependent upon the BLM and its partners to provide facilities, services, and active resource and social management. Without active recreation management including specially-designated use areas, designated trails, and public information on road and trail systems, the resulting recreation setting will offer a high degree of freedom of choice, but will also result in limited opportunities for many types of recreation. Without active recreation management, most BLM lands in the urban interface will be defined by a dense network of undesignated, user-created roads and trails, impacted natural and cultural resources, and a degraded social experience unpopular with many legitimate recreation users, even to the point of displacing some users. There is good evidence to show this is already happening in some places within the planning area.

20. The demand for Special Recreation Permits for non-motorized trail use will increase, partially due to development of additional destination resorts adjacent to BLM-administered lands in the planning area.

Analysis of Alternatives

Alternative 1

Special Recreation Area Designations
Alternative 1 treats the planning area as an Extensive Recreation Management Area (ERMA), with relatively few controls or regulations on recreation use, when compared with Alternatives 2-7. No Special Recreation Management areas would be identified and the planning area would not have a specific identity as a high use recreation area. Lacking this identity, the ability to communicate management strategies or garner additional funds to implement the plan would be less than Alternatives 2-7.

Travel Management/Recreation Emphasis Designations
For alternative 1, the majority of the planning area is open year-round to motorized use (approx. 81 percent). Approximately 25 percent of this travel management designation is managed for motorized vehicle use on existing roads and trails, while about 32 percent is managed for vehicle use on designated roads and trails (mainly in the Millican Valley OHV area). Seasonal Closures to motorized use include winter/early spring motorized closures of South Millican and North Millican OHV areas. Most of the planning area is not managed to separate different types of recreational users or provide trail opportunities specifically for non-motorized uses. About 78 percent of the planning area is managed for multiple use (motorized and non-motorized) on the same system of existing or designated roads and trails.

Alternative 1 does allow the greatest degree of user conflicts and conflicts between recreationists and adjacent landowners. Interestingly, the majority of the acreage that is designated Open (i.e., cross-country travel allowed) is located in the most urban and densely developed portions of the planning area (Steamboat Rock, Bend-Redmond, La Pine, and a portion of Cline Buttes). Management of motorized use either by seasonal closures or development of designated route systems is primarily in response to wildlife or other ecosystem needs, not social conflicts.

The Millican Valley OHV trail system is the only recognizable and managed trail system in the planning area. Outside this area, the lack of designated, signed or maintained trails will lead to user creation of trails, user conflicts, resource damage, trespass, and a general lack of knowledge about recreation opportunities on BLM managed lands, particularly for out of area visitors. Approximately 75 percent of the designated trail system acreage in Millican Valley is closed during the winter and early spring months when trail use on BLM lands is most popular – which may result in concentrated use in areas without clearly designated trail systems such as Millican Plateau and Cline Buttes.

Nearly all of the La Pine area is treated as an Extensive Recreation Management Area, with few controls or management of recreation use. With the exception of the Rosland OHV play area, and a small closure area near La Pine State Park, the entire area is designated "Open", with cross-country travel by motorized vehicles allowed. The Rosland OHV play area and surrounding area are managed for motorized use on designated trails and in the play area.

Little, if any, of the planning area receives intensive recreation management resources (an area with motorized and non-motorized uses separated on different road or trail systems). While this means that management costs are relatively low compared to other alternatives, it also means the diversity and quality of recreation opportunities is lower.

Thirteen percent of the planning area is seasonally closed to motorized use, while only 1.6 percent is closed year-round to motorized use.

The recreation characteristics of Alternative 1 are displayed in Table 4-22.

Motorized Use (Roads and Trails)
Alternative 1 allows a high degree of user choice and flexibility for motorized recreation; however, a large portion of the Millican Valley OHV trail system would not be available for motorized trail use during the winter when the use demand is highest. The only other area where a designated trail system is proposed is Cline Buttes, and this alternative offers the highest degree of flexibility for development of a motorized trail system in this area. If the seasonal restrictions are successfully implemented for this alternative, use levels in Cline Buttes may continue to increase at a faster rate than for those alternatives where North Millican is open in the winter (i.e., Alternatives 2, 4, 7 and to some extent, 5). For much of the remainder of the planning area (La Pine, Bend-Redmond, Prineville Reservoir, etc.) the lack of designated roads and trails would provide opportunities for exploration, but no understandable, consistent, and maintained motorized recreation opportunities that can be communicated/promoted to the public.

For general, motorized access that supports a variety of recreation uses (i.e., sightseeing, rockhounding, target shooting, etc.), Alternative 1 provides a high degree of access and user choice, since more the planning area is Open to cross-country travel or travel on existing roads than in any other alternative. No direction would be provided to reduce redundant access points or upgrade parking/trailhead areas outside of the Millican Valley OHV area. The lack of road and access management strategies would likely result in increased road densities and poor recreation opportunities due to dumping, confusing road networks, and general unmanaged appearance of many areas. Motorized access in the Badlands WSA would remain at approximately 7.6 miles of routes open year-round, with an additional 12.9 miles of route available seasonally (See Table 4 - 23).

Table 4-22. Recreation characteristics of the alternatives, in acres (and percent). Most figures rounded to whole numbers.

Recreation Management Emphasis	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Multiple Use with Shared Facilities	315894(78)	311,975(77)	157,467(39)	269,010(67)	210,730(52)	165,674(41)	153,081(38)
Multiple Use with Separate Facilities	0	0	29,086(7)	0	40,856(10)	31,020(7.7)	27,196(6.7)
Emphasis on Non-Motorized Use	42(0.01)	58,532(15)	65,497(16)	92,081(22.9)	86,214(21)	69,392(17)	87,367(22)
Exclusive Non-motorized use management	11,111(2.7)	25,699(6.4)	81,619(20.3)	24,316(6.0)	54,548(14)	83,804(21)	87,832(22)
Roads Only, low recreation emphasis	75960(19)	5,273(1.3)	67,930(16.8)	15,747(3.9)	9,954(2.5)	51,548(13)	47,428(12)
Non-Recreation Emphasis		1,524(0.4)	1,404(0.3)	1,564(.4)	405(0.1)	1,564(.4)	1,563(.4)
Travel Management Designation	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**	**Alt. 6**	**Alt. 7**
Designated Open[1]	153664(38)	0	0	0	0	0	0
Designated Closed	6554(1.6)	20,336(5)	75,960(19)	23,473(5.8)	48,016(11.9)	78,429(20)	91,755(23)
Limited to designated roads only year-round	80517(20)	89,050(22)	111,298(28)	98,333(24)	92,447(23)	68,871(17)	83,230(21)
Limited to designated roads only – closed seasonally	0	396(0.1)	11,329(2.8)	41,015(10)	41,375(10.3)	51,394(13)	49,203(12)
Limited to designated roads + trails year-round	0	282,025(70)	101,937(25)	211,370(52)	154,738(38)	136,583(34)	157,724(39)
Limited to designated roads + trails - closed seasonally	47,146(12)	11,196(2.8)	77,804(19)	24,080(6)	66,426(17)	62,534(16)	17,685(4.4)
Limited to existing roads + trails year-round	95065(24)	0	0	0	0	0	0
Limited to existing roads + trails - closed seasonally	4651(1)	0	0	0	0	0	0
Closed at specified snow depth	15399(3.8)	0	19,847(4.9)	0	0	0	0
Limited to type of vehicle	0	0	0	4,731(1.2)	0	5,191(1.3)	4,868(1.2)
Seasonal Use Restrictions	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**	**Alt. 6**	**Alt. 7**
Open Year-Round[2]	329,259(82)	371,074(92)	218,102(54)	314,434(78)	247,185(61)	210,646(52)	245,822(61)
Closed Year-Round	6,554(1.6)	20,336(5)	75,960(19)	23,473(5.8)	48,016(12)	78,429(20)	91,577(23)
Closed December 1 through March 15	0	396(0.1)	0	0	0	0	0
Closed December 1 through March 31	0	11,196(2.8)	5,428(1.3)	11,237(2.8)	11,237(2.8)	5,428(1.3)	5,872(1.4)
Closed December 1 through April 15	4,624(1.1)	0	0	0	0	0	0
Closed December 1 through April 30	33,647(8.3)	0	65,647(16)	32,713(8.1)	0	90,445(22)	42,935(11)
Closed December 1 through July 31	13,525(3.4)	0	17,661(4.4)	0	0	0	17,685(4.4)
Closed December 15 through March 15	0	0	396(0.1)	0	396(0.1)	396(0.1)	396(.09)
Closed January 1 through April 30	0	0	0	21,144(5.2)	48,769(12)	0	0
Closed February 15 to July 31	0	0	0	0	17,657(4.4)	0	0
Closed march 15 to September 15	0	0	0	0	0	17,658(4.4)	0
Closed July 15 to December 15	0	0	0	0	29,742(7.4)	0	0
Snow Closure - Variable Date	15,399(3.8)	0	19,847(4.9)	0	0	0	0

[1] **Open Designation** – BLM designates areas as "Open" for intensive OHV use where there are no compelling resource protection needs, user conflicts, or public safety issues to warrant limiting cross-country vehicle travel.

[2] **Open Year-round (Seasonal Classification)** – any area that is open to motorized vehicle use year-round either as an open area with cross-country travel permitted; an area limited to designated roads, trails, or both; or an area limited to specific vehicle types.

Table 4 - 23. Badlands WSA Travel Management by Alternative (expressed in miles)

	Alternative						
	1	2	3	4	5	6	7
Motorized routes available Year-round	7.6	23.4	0	0	0	0	0
Motorized routes available seasonally	12.9	0	0	23.4	17.7	0	0
Non-motorized routes available year-round	28.3	25.4	49	25.4	31.1	49	49
Mechanized routes available year-round	49	49	49	49	49	0	49

For all alternatives, the approximately 49 miles of inventoried routes would be available for non-motorized, non-mechanized use year-round. For Alternative 5, motorized routes available seasonally would also be available for game retrieval (as part of a legal hunt) during the closure period.

The management of the Northwest Block would be inconsistent with adjacent CRNG travel management policy, which closes adjacent CRNG lands to motorized use during the winter.

Non-Motorized Use (Roads and Trails)
Non-motorized trail use (equestrian use, hiking/running, mountain bike, etc.) opportunities would be limited under this alternative. No specific direction for development of non-motorized trails would exist. The effects on non-motorized trail users would be similar to the effect on motorized trail users – without mapped, understandable, designated trail systems, the ability for many people (particularly infrequent or out of area visitors) to participate in trail use activities on BLM-administered lands would be lower than Alternatives 2-7. In general, user conflicts would continue and possibly increase as more recreationists utilize the same designated or user created trail systems.

Alternative 1 does provide some opportunities for non-motorized trail use in the Steelhead Falls and Badlands WSA, and on designated trails in the Millican Valley OHV area. However, trails in Steelhead Falls WSA are relatively short in length, and are ill-defined and generally not maintained. Under this alternative about 28 miles of routes in the Badlands WSA are available for exclusive non-motorized use year-round. More miles of exclusive non-motorized routes are available when routes 5, 6, and 7 are closed to motor vehicles from December 1 to April 30. The designated trail system in North Millican and South Millican areas are open to non-motorized use, and in the winter/early spring, these trails are available to non-motorized, non-mechanized use exclusively. However, these trails are not designed specifically for non-motorized use. Alternative 1 does close these trails to mountain bikes during the winter/early spring, which represents a fairly large closure area close to Bend. Although this restriction has not been widely enforced or publicized in the past, if it was widely recognized, it may tend to increase use in the adjacent Horse Ridge and Badlands WSA areas, as well as on undesignated trails at Cline Buttes.

Rock Climbing
No specific management would be applied to rockclimbing in the popular use area adjacent to Smith Rock State Park (BLM-administered lands along the Crooked River and crags located north and east of the State Park). In addition, the Sisters Bouldering Area would not be identified or managed specifically for climbing use unlike the action alternatives. Under Alternative 1, Pictograph Cave would be closed to all visitation, eliminating caving and rock climbing activities at this location (See Caving section, below).

Interpretive/Educational Use
With the exception of the existing Wagon Roads ACEC, no areas would be designated or managed specifically for interpretive use.

Caving/Cave Dependent Recreation
In addition to the cave management measures outlined in Common to Alternatives 2-7 below, the following effects to cave-related recreation occur for Alternative 1:

Pictograph Cave would be closed to all visitors. The opportunity for caving would be reduced somewhat on BLM-administered lands, since Pictograph Cave is one of the larger caves located on BLM managed lands. However, there would still be opportunities for caving on BLM-administered land and at the lava tubes on USFS, Deschutes National Forest lands. Opportunities for sport climbing at Pictograph Cave would be eliminated under this alternative.

Special Recreation Permits/Group Uses
Alternative 1 does not place any specific limits on SRPs, either for commercial, competitive, or organized group events. However, the lack of designated roads and trails throughout most of the planning area under this alternative would make authorization of special recreation permits for both motorized and non-motorized use difficult. The one area relatively close to Bend with designated trails (North and South Millican) would be closed to trail dependent events during the winter. The lack of SRP opportunities for trail activities on BLM would shift this use to the USFS managed areas that do not receive heavy snowfall and to BLM lands further east of the planning area. The lack of SRP opportunities would also tend to increase the illegal commercial and group event activities currently taking place on BLM-administered lands. Areas of high interest for these uses, based on past requests (e.g., Badlands WSA, Steelhead Falls WSA, Millican OHV area, and Cline Buttes) would continue to have the following impediments: 1) Interim Management Policy requires an EA for SRP authorizations in the Badlands and Steelhead Falls WSA, and BLM generally lacks sufficient staff to do these EAs, and 2) The North Millican area is closed to events during the winter, when demand is heaviest. Cline Buttes currently does not have a designated trail system or parking/staging areas. In the Cline Buttes area, at least for the short term (3 to 5 years), the processing of trail use permits would be difficult, if not impossible due to the lack of designated trails that have received NEPA clearance.

OMD Use
Due to the large amount of acreage designated Open in Alternative 1, the use of the Bend-Redmond block for motorized trail use may not be as great as other alternatives. However, Alternative 1 does not call for designated road and trail systems in the Bend-Redmond block, so while the recreational use may be relatively low, it is unmanaged and may lead to conflicts between OMD's permitted use and recreational use. Given these two factors, conflicts between OMD use and recreation for Alternative 1 may be fewer than most other alternatives except Alternatives 2 and 3 (which may tend to concentrate more recreation use in the Bend-Redmond block).

Alternative 1 does not provide additional training areas (i.e., Steamboat Rock and Millican) for the OMD. While potential conflicts with recreation use in these areas would be avoided, the BLM would lose any partnership opportunities with OMD to improve resource and recreation conditions in these areas. The lack of these partnership opportunities may have a long-term negative effect on recreation, as the management costs of these areas continue to rise with the region's population growth.

Wildlife
Wildlife management prescriptions in Alternative 1 result in the seasonal closure of the North Millican and South Millican areas, as well as the Badlands WSA. The closure of the North Millican area from December 1 to April 30 restricts the use of approximately 61

miles of designated trails during the period of highest demand for motorized trail use in the planning area. About 48 miles of designated trails remain open in Millican Plateau during this closure, as well as additional trail miles in the portion of Millican Plateau that is limited to existing routes. However, the reduction in overall miles of designated and maintained trails is a negative effect on motorized trail use, particularly for those riders coming from out of area, who do not have the time to discover appropriate and useable trail loops in the unmanaged, undesignated portion of Millican Plateau.

Like other alternatives that seasonally close all or a portion of the North Millican Area (Alternatives 3, 4, 5, and 6), there may be a positive effect on non-motorized recreation, as the designated trail system would be open to this use during the closure period for motorized use. In general, the high use period for non-motorized uses is also during the late fall, winter period. To some extent, the lack of facilities specifically for non-motorized users or lack of trails engineered specifically for their use (e.g., technical single-track for mountain bikes), limits the benefit of this exclusively, non-motorized use period.

The closure period for motorized use in South Millican results in greater effects to motorized recreation, since the trails (about 12 to 14 miles) would be closed for all but 4 months of the year. Generally, three of these months occur during conditions that do not provide quality riding opportunities. The benefit of this closure to non-motorized uses is somewhat limited, as non-motorized use tends to occur more regularly in the areas surrounding the South Millican OHV area (e.g., Horse Ridge).

Several other seasonal closures occur in Alternative 1, including winter closures at the Tumalo block and north of Prineville Reservoir. These areas do not have designated trail systems for any users, and thus may not represent a major effect on existing recreation use. However, these closures have restricted access for non-motorized users since often, no provisions for access around locked gates are made.

Cumulative Effects

The lack of management direction for non-motorized trails, coupled with the region's population growth and increase in development adjacent to BLM-administered lands, would likely lead to an increase in user created non-motorized trails. The existing use of trails on the Deschutes National Forest for mountain biking will increase the demand for trail use on BLM-administered lands that offer fall, winter, and early spring riding opportunities. The lack of management direction for providing designated trails may lead to an increase in user created routes, particularly at locations close to Bend (Cline Buttes, Horse Ridge, and Tumalo blocks).

The demand cited above, coupled with the paving of Millican/West Butte Road that leads to easier public land access, may result in increased use of existing trails, and improvement or development of additional trails for non-motorized use in Millican Valley, particularly in challenging terrain such as at West Butte.

The lack of management direction for developed and managed access points, coupled with the same growth factors, would likely lead to an increase in user created roads and a deterioration of existing road conditions as more people use roads that receive little or no maintenance and chose to create new routes that offer better driving conditions.

Potential increased development at Prineville Reservoir State Park may increase use levels on BLM-administered lands adjacent to State Park and BOR managed lands. Lack of recreation management goals for these lands may result in poor quality recreation opportunities, confusing trail and road access conditions, and lack of coordination between the agencies.

The regulations on rockclimbing, establishment of bolt protected (sport climbing) routes, and bouldering adopted by the USFS in the Road 18 Caves Project EA would, when combined with the closure to all use at Pictograph Cave in Alternative 1, eliminate most opportunities for sport route climbing in caves close to Bend. Some opportunities for bouldering in USFS administered caves would remain. The cumulative effect of USFS and BLM policy would reduce the diversity of climbing opportunities somewhat in Central Oregon.

Conclusions
Alternative 1 provides a limited diversity of recreation opportunities, managing the planning area as an extensive recreation management area with few provisions made for specific recreation settings. With the exception of Cline Buttes, Millican Valley, and both WSAs, recreation use would be self-directed, with little, if any, information or facilities (including designated roads and trails) provided. In general, no provisions would be made to reduce conflicts other than a reactive, case by case response.

Common to Alternatives 2-7

Special Recreation Area Designations
All action alternatives provide a greater identity for the planning area by designating most of the area as a Special Recreation Management Area (SRMA). The SRMA and its different geographic areas are shown in Map 1, UDRMP Planning Area. For all action alternatives, SRMA designation may increase the awareness of the management needs and recreation opportunities in the planning area, and increase the ability for BLM to partner with community groups and other organizations.

Travel Management/Recreation Emphasis Designations
The common themes throughout all action alternatives are a planning area-wide change in travel management from large areas being designated as Open or as Limited to Existing road and/or trails to areas designated as Limited to designated roads and trails where these uses are provided for. This would change the overall management emphasis of BLM lands in the planning area in a fundamental way, removing the emphasis on exploration, user choice, and self-creation of recreation opportunities. In effect, the combination of management decisions in all action alternatives changes the recreation opportunities from those in a an Extensive Recreation Management Area (ERMA – See XX) with a more intensively managed recreation experience, with greater definition of available opportunities, regulations, and different recreation settings.

Alternatives 2-7 place an emphasis on development of road and trail systems that replace the user created or historic system of roads/trails that do not provide loops and often dead-end at private land boundaries. Concurrent with this direction, there is an overall direction to reduce the number of redundant road access points, and provide well placed access points that minimize conflicts with adjacent land owners. All alternatives would close parking areas, trailheads and staging areas to overnight use unless otherwise designated and posted. This measure would help reduce conflicts with adjacent landowners and reduce the amount of illegal occupancy, particularly for alternatives that close areas to motorized vehicle use near communities.

If these travel management/engineering solutions are implemented, some degree of user choice, exploration, and self-reliance would decrease as the entire area moves toward a designated road and trail system. However, there would be some increase in quality and availability as people from out of area or infrequent visitors can utilize mapped, designated and signed transportation systems.

If these travel management/engineering solutions are implemented, there would be a reduction in conflicts in many areas, and likely an increase in recreation quality, as the road system could be designed to provide loops, remove confusing braided road

networks, and avoid dead-end roads and minimize conflicts with adjacent property owners. However, given the amount of acreage identified for designated road and trail systems, it is likely that in the short term, many areas will not undergo specific road and trail planning and will either remain as unmanaged travel networks or have interim systems implemented that do not offer quality recreation experiences due to a lack of quality road/trail facilities/alignments or just an overall shortage of road/trail miles contained in interim systems (which will likely rely heavily on roads versus trails). Areas that do not currently contain designated travel systems, but have a high level of existing motorized recreation use will likely see reductions in motorized trail opportunities over the short-term for all alternatives, until area specific recreation management plans are prepared. Of all the geographic areas in the UDRMP area, the effects to motorized use in Cline Buttes would likely be the greatest.

Motorized Use (Roads and Trails)
See Travel Management section, above, for direction.

Non-Motorized Use (Roads and Trails)
All action alternatives call for an increase in non-motorized trail development. Although the alternatives vary in the amount of acreage devoted to this use, either exclusively or in combination with motorized trail or road use, every action alternative increases the non-motorized trail emphasis from the current situation (i.e., no emphasis). All action alternatives call for BLM to provide travel and access maps, to designate river access points (providing managed, maintained parking areas and trails where legal access exists to rivers, particularly the Middle Deschutes). This measure would reduce effects to river corridors from unmanaged trail use and provide additional opportunities for hiking, wildlife observation, fishing, and other recreation uses. Some additional conflicts with adjacent landowners may occur due to designation and improvement of access points, as some access points may increase in popularity. To mitigate this, the UDRMP does call for locating designated parking areas/trailheads away from private lands to the extent feasible.

All action alternatives identify the North Unit Main Canal as a potential regional trail and direct BLM to work with other agencies and local governments to explore this opportunity where the canal bisects the Bend-Redmond block. This trail could form an important recreation component for the area, serving a Statewide Comprehensive Outdoor Recreation Plan identified need for regional trails, particularly for trail use during the wintertime. However, given the canal's management by BOR, designation of this canal as a regional trail is outside the scope of this plan or BLM's authority.

All action alternatives call for management of the Skeleton Fire/Horse Ridge area specifically for non-motorized trail development. All of the alternatives call for provision of non-motorized trail development around Prineville Reservoir. For all action alternatives, the Dry River Canyon would be managed as a non-motorized trail and the base of the canyon would be managed to provide designated parking and to eliminate the braided road network and user created campsites throughout the area.

All action alternatives identify needs for developed and designated access points, trailheads, etc. and establish goals for providing day use facilities (picnic tables, trash containers, restrooms, at these as necessary). In addition, Alternatives 2-7 close these areas to overnight use, except where specifically designated for such use. Depending on the level to which these facilities are developed, there would be an increase in the diversity and quality of recreation opportunities. In areas where these types of improvements are made, visitors would see a managed area as an entry statement instead of the widespread current condition of braided roads, dumped garbage and abandoned automobiles.

Interpretive Use
All action alternatives would designate several additional areas for interpretive use, including an enlarged Wagon Roads ACEC, and a Tumalo Canal ACEC (or equivalent for alternatives that designate larger ACECs throughout the Cline Buttes block). These areas would be managed specifically for interpretive use, and would be identifiable areas that could conceivably get a large amount of hiking, sightseeing and interpretive use. All action alternatives would close the Redmond Caves parcel to motorized use, and provide conditions that foster interpretive/educational use.

Special Recreation Permits/Group Uses
Although not specifically a Special Recreation/Group Use guideline, if the plan direction for additional designated trails is implemented, there would be an increase in the ability to issue Special Recreation Permits for trail rides and other trail dependent events. A greater diversity of designated trails, particularly in areas of steady use over the past 10 years, would allow for easier review and authorization compared to requests to use non-designated trails.

Over the short-term, all annual special recreation permits for trail use would not be renewed until such use was authorized on designated trails that are part of BLM's transportation system. Over the short term, this would eliminate the two annual SRPs for equestrian use in the planning area. However, this would also provide an impetus for trail designation in areas that currently do not have any identifiable trail systems.

Over the long-term, as more designated trails (both motorized and non-motorized) are developed, it is likely that this policy would direct annual recreation permits to larger areas with substantial trail systems. Smaller commercial operations and commercial operators that are tied to a specific location (e.g., small guest ranches) would have a harder time gaining permits if they are located adjacent to BLM lands that do not have designated trails and lack the ability to shuttle clients to larger BLM areas with designated trails.

All action alternatives provide general policy for management of group use and SRPs, in many cases applying specific group use, special recreation event, or commercial use stipulations for Special Management Areas such as ACECs, RNAs, etc. These restrictions generally limit recreation use to activities that do not impair the values for which an area has been designated. Therefore, for all alternatives there is an increase in the acreage that is closed to motor vehicle use, firearm discharge, campfires, etc. in order to provide opportunities for interpretation, hiking, etc. Generally, these limitations are applied to relatively small areas, and while they would result in a loss of certain recreation opportunities, if implemented successfully, these areas would offer other, new recreation opportunities such as interpretation, group use, nature study, etc.

All action alternatives provide for increased oversight of organized (non-commercial) group use. All organized groups of over 20 people would require a permit for activities on BLM-administered land. For WSAs, group use of over 12 people would require a permit. This policy would remove the present uncertainty about when/if a permit is needed for group use. If this policy is effectively communicated to the public, it would result in fewer user conflicts, conflicts between public land users and adjacent landowners, and conflicts with permittees. There is no limit set on the overall number of group use permits allocated; however, there may be a reduction in organized group events due to the time it would take the BLM to review and issue permits. As stated above, the movement towards a greater diversity of designated trail systems in the planning area would likely make permit review and authorization much easier.

Rock Climbing
Alternatives 2-7 would specifically identify climbing as a management emphasis for the parcel in Fremont Canyon identified as the Sisters Bouldering (a.k.a. Sisters Climbing)

area. The area would be managed to limit motorized travel to a designated access road and parking area. The management of the area would focus on day use activities in order to maintain the natural setting of the site and minimize conflicts with adjacent landowners.

Special Management Areas

All action alternatives call for specific closures or limitation on certain uses, particularly in Special Management Areas such as WSAs, ACECs, and RNAs. Some of these area or site-specific restrictions include limitations on recreational use of smaller parcels (e.g., 40 acre parcels) in developed areas. In many cases, the Special Management Areas that are common to all action alternatives are relatively small, and while they would represent a loss of certain opportunities such as motorized recreation, overnight camping, campfires, target shooting, paintball use, rockhounding, geocaching, etc, given the small scale of these areas in relation to the availability of opportunities elsewhere on BLM lands, the total effect would be minor.

For all action alternatives, the designation of ACECs would provide new recreation opportunities for interpretation and education activities.

Under all action alternatives, mountain bike use on existing trails within the Horse Ridge RNA would not be allowed. This would fragment part of an existing trail system that has generally been in use over the past decade, and likely would result in the need for and/or creation of new trails to skirt the boundaries of the RNA.

Caving/Cave Dependent Recreation

Management policy for significant caves and caves nominated for significance are contained in the provisions of the Federal Cave Resources Protection Act and existing BLM regulations. These are incorporated by reference in the RMP. Additional cave management policy for all action alternatives include limitation on the size of groups allowed in caves. This restriction may limit future educational/commercial use in caves. All alternatives close Significant/Nominated Caves would be closed to geocaching (i.e., the leaving of cache items). This limitation would represent a fairly small restriction on this use, since even with other restrictions on geocaching (closure of ACECs, RNAs, and WSAs) the majority of the planning area would remain open to this use. In any case, the use of the above mentioned areas for virtual geocaching (where items are not left) would remain.

Fuels/WUI Treatments

For all action alternatives, the fuels treatment measures proposed for WUI zones may increase conflicts between recreationists and adjacent landowners, since buffering/screening vegetation along property lines will be removed. The mowing of areas adjacent to private property may result in increased levels of motorized and non-motorized travel along these mowed areas, since they would offer a path of least resistance. There would likely be a corresponding increase in user conflicts due to noise, dust, trespass, perceived safety issues related to firearm discharge, etc. WUI treatments may also increase the number and dispersal of motorized access points, as adjacent residents use the WUI mowed area as an ingress/egress for their property. The issuance of permits for wood product collection in these areas may also increase the incident of unauthorized motorized use in these areas over time, as people continue to collect/harvest wood products both with and without permits.

Wildlife and Wildlife Habitat Management

The emphasis on wildlife habitat effectiveness (70 percent) in many areas designated for non-motorized trail use emphasis (e.g., Tumalo, Northwest, Smith Rock, Prineville Reservoir, Horse Ridge/Skeleton Fire) may limit extensive development of trail systems

for non-motorized use. However, the long-term effect of this direction is uncertain, since the RMP does not identify specific trail alignments or non-motorized trail density standards.

Public Health and Safety Designations
Closures of areas to target shooting may increase recreation quality for other users (see Public Health and Safety Section). In addition, the closure of parking areas, trailheads, etc. to overnight use may reduce user conflicts and conflicts with adjacent landowners somewhat.

Cumulative Effects
The combination of motorized trail use and OMD use in the Bend-Redmond block may result in conflicts between these two uses, although OMD's use of this area is infrequent at most (about 14 days per year). These uses together may conflict with adjacent residential uses, both for inholdings and private lands adjacent to BLM. Future transportation projects associated with State Highway 97 and a permanent secondary access to Pronghorn Resort may result in greater fragmentation of the Bend-Redmond block and may make creation of full day motorized trail riding opportunities difficult, if not impossible.

The presence of designated trails in the North Millican/Millican Plateau areas, coupled with the paving of the Millican/West Butte Road would likely result in increased visitation to this area, and an increase in the diversity of recreation uses of this area due to the easier access for all types of vehicles.

The increased population growth and cost of living in Central Oregon, the existing 14-day camping stay limit throughout the planning area, and the common travel management regulations (roads open year-round) for many areas (Cline Buttes, Bend-Redmond, Mayfield, Horse Ridge) would likely result in increasing numbers of people residing on BLM-administered lands. Although Alternatives 2-7 close some areas to overnight use, and some areas to motorized vehicle use, in general, most of the area immediately adjacent to Redmond remains open to motorized vehicles and overnight use in all alternatives. Under this condition, it is likely that there will be an increase in the current level of illegal occupancy and resulting conflicts, particularly for permittees, recreationists, and adjacent residents.

Conclusions
All action alternatives provide a greater diversity of recreation opportunities and separation of different user types than Alternative 1. All action alternatives eliminate the large scale, Open travel management designations contained in Alternative 1. If these designated travel systems are implemented throughout the planning area, there would be a major shift from the current recreation setting where visitors can explore and create their own opportunities with little management controls. This would change longstanding uses, perceptions and "traditional" use in the planning area, and thus represent a major increase in management costs and communication needs for the BLM.

Alternative 2

Special Recreation Area Designations
Same as Common to Alternatives 2-7

Travel Management/Recreation Emphasis Designations
Alternative 2 emphasizes the use of shared road and trail facilities for all users, to a much greater degree than all other action alternatives and the no-action alternative. Approximately 77 percent of the planning area is managed for multiple use on shared facilities in Alternative 2. The only large area where trails are developed for non-motorized use is the Skeleton Fire and Horse Ridge areas, although some routes in the

Badlands are managed for non-motorized use only. Many small parcels of BLM managed land are closed to motorized use; however, this alternative closes the least amount of land to motorized use (approximately 5 percent). The largest single area designated closed to motorized use would be the Smith Rock parcel of BLM managed land. Alternative 2 also provides the greatest opportunity for unrestricted year-round access to public lands, with approximately 92 percent of the area open year-round. Seasonal closures are generally limited only to the Northwest and Tumalo blocks of BLM managed land. Motorized recreation opportunities are spread throughout the planning area, with Millican Valley, the Bend-Redmond block, and Cline Buttes all being managed for motorized use on designated trail systems. Management of the Bend-Redmond block would change from "Open" to a designated system. Management of the Cline Buttes block would change from limited to "Existing" roads and trails to a specific designated trail system.

The La Pine area would receive more active recreation management that the current direction, with most of the area changing from an Open designation to a network of designated roads and trails. The northern 1/3 of the area (near La Pine State Park) would be managed for motorized use on designated roads only.

Areas that receive the most intensive, high-cost management resources (areas with motorized and non-motorized uses separated on different road or trail systems) comprise about 14.5 percent of the planning area.

2.8 percent of the planning area is seasonally closed to motorized use, while only 5 percent is closed year-round to motorized use.

Specific effects to recreational activities are described below:

Motorized Use (Roads and Trails)
Alternative 2 would provide the highest amount of recreation opportunities for motorized use of all alternatives, with approximately 92 percent of the planning area open to motorized use on designated road and/or trails year-round. Alternative 2 does represent a large difference from Alternative 1 in management of motorized use. While Alternative 1 allows cross-country motorized use on 38 percent of the planning area, Alternative 2 does not provide for any cross-country use (i.e., areas designated as Open). Along with all other action alternatives, the shift from Open to designated travel systems over a large portion of the planning area will require much more intensive BLM management, including road and trail rehabilitation, maintenance, closing unneeded roads/trails, and new road/trail construction.

Under Alternative 2, very few areas would be managed for separate motorized and non-motorized trail systems, and all users would be expected to share the same system. Motorized recreation opportunities would be greatest in the Millican Valley OHV area, since this area has a history of use and an existing system that could be revised relatively easily to respond to the paving of West Butte Road. The quality of the riding opportunities would be relatively high, as the entire Millican Valley OHV area would be open during the winter/early spring. With more miles of trails in a large area, riders would be spread out and experience fewer encounters and conflicts during a day of riding.

Nearly all of Cline Buttes and the Bend-Redmond block would be available for designation of shared use trails (for motorized and non-motorized use). Like Alternative 4, this alternative does provide some motorized trail opportunities north of Prineville Reservoir (which are lacking in all other alternatives).

For general, motorized access that supports a variety of recreation uses (i.e., sightseeing, rockhounding, target shooting, etc.), Alternative 2 provides the second highest degree of access and user choice (Alternative 1 provides the greatest), since more the planning area

is managed for designated roads and trails available year-round. Alternative 2 provides the greatest degree of motorized recreation opportunities in the Badlands, with about 23 miles of inventoried routes available for motorized use (See Table 4 - 23). While the high degree of access may be considered a positive effect for hunting activities, Alternative 2 would also represent a less diverse set of hunting opportunities, as there would be fewer areas with restricted access and primitive hunting opportunities than Alternative 1 and most of the action alternatives.

The size and location of Closed areas would have the least effect on motorized recreation use compared to Alternatives 3-7. In general, the areas designated Closed to motor vehicles in Alternative 2 are small, isolated blocks in urban settings or those that generally do not offer high quality motorized trail experiences.

Non-Motorized Use (Roads and Trails)
Alternative 2 provide the least amount of acreage specifically allocated for non-motorized recreation. While trails would be available in many areas for non-motorized use (such as Cline Buttes, Mayfield, Steamboat Rock, Prineville Reservoir, etc.) these trails would be shared use trails and depending on the level and types of use, may result in user conflicts between motorized and non-motorized recreationists to the point where the experience is degraded for all users.

While Alternative 2 provides the least amount of acreage specifically for non-motorized trail use of all the action alternatives, it does provide direction for a small increase over Alternative 1 in areas managed for non-motorized trail designations. These areas include the Skeleton Fire and Horse Ridge areas, the area south of Alfalfa Market Road, the Northwest and Tumalo Blocks, and the Taylor Butte area at Prineville Reservoir. Management of these areas all provide for small amounts of motorized access on roads; however, the amount of roads would generally be limited to a few main roads and the recreation emphasis would be on providing a workable trail system. Unlike Alternatives 3-7, there would be no large areas designated for exclusive non-motorized use, and opportunities for non-motorized trail use in areas of quiet and solitude would be the most limited among the action alternatives. Given this alternatives reliance on providing non-motorized trails in areas with motorized road access, there would be a relatively high degree of management intensity through signage, maps and patrols to maintain separation of users between road and trail use.

Special Recreation Permits/Group Uses
The provision of non-motorized designated trails in some areas would allow for greater ease in issuing special recreation permits for trail dependent uses, including commercial, competitive and group use. This benefit would likely be greatest in the Skeleton Fire and Horse Ridge areas, where trails would be provided exclusively for non-motorized use and where demand currently is relatively high. The demand for special recreation permits for non-motorized trail events is also high in Cline Buttes and likely will increase in the Bend-Redmond and Millican Plateau or Mayfield areas with the development of new resorts. In the case of the Cline Buttes area, Alternative 2 may require the temporary closure of trails to certain users (e.g., motorized) during special events to provide for visitor safety.

There would be few, if any, restrictions on the management of motorized events. The seasonal closure to events in Millican Valley would not occur.

Rock Climbing
Rock climbing opportunities would be managed similar to most of the other action alternatives. No specific management guidelines would be provided for management of climbing routes adjacent to Smith Rock State Park, other than an emphasis on rehabilitation, stabilization, and consolidation of climbing area access trails. The Sisters Climbing area would be managed for climbing opportunities specifically. Establishment

of sport routes in Pictograph Cave would be allowed, which would provide a somewhat unique climbing opportunity regionally (see also Caving/Cave Dependant Recreation, below).

Interpretive Use
As with the other action alternatives, several additional areas would be designated for interpretive use, including an enlarged Wagon Roads ACEC, and a Tumalo Canal ACEC. These areas would be managed specifically for interpretive use, and would be identifiable areas that could conceivably get a large amount of hiking, sightseeing and interpretive use.

Caving/Cave Dependent Recreation
Pictograph Cave would remain specifically available for the installation of sport climbing routes in areas not posted as closed to this activity. It is uncertain how much climbing would be affected under this alternative, since it is reasonable to assume that many areas of past route development occur in locations of cultural resources and would be closed to route development. Although the difficulty of these routes may limit visitation somewhat, the fact that Pictograph Cave would be the only cave open to sport climbing (bolt protected routes) in the Arnold Lava Tube system would tend to increase visitation over time. Pictograph Cave would be closed seasonally to all visitors, which would reduce cave recreation opportunities on BLM land somewhat; since Pictograph Cave is one of the larger caves located on BLM managed lands. However, there would still be opportunities for caving on BLM managed land and at the lava tubes more prevalent on USFS, DNF lands.

OMD Use
Since the entire Millican Valley area and Cline Buttes would be available for motorized trail development, the use of the Bend-Redmond block for motorized trail use may not be as great as other alternatives (that place restrictions in Cline Buttes or Millican). Therefore, conflicts between OMD use and recreation may be fewer than most other alternatives.

Alternative 2 does not provide additional training areas (i.e., Steamboat Rock and Millican) for the OMD. While potential conflicts with recreation use in these areas would be avoided, the BLM would lose any partnership opportunities with OMD to improve resource and recreation conditions in these areas. The lack of these partnership opportunities may have a long-term negative effect on recreation, as the management costs of these areas continue to rise with the region's population growth.

Wildlife/Wildlife Habitat Management
Wildlife management goals in Alternative 2 provide the least restrictions for public access and recreation among the action alternatives. The emphasis on current distribution of source habitats and relatively low (compared to other action alternatives) acreage with primary wildlife management emphasis provide the most flexibility for a wider range of recreation opportunities or an increased emphasis on year-round access. While Alternative 2 would provide direction for restoration of sage grouse habitat by thinning/cutting juniper to increase sagebrush steppe plant communities, there would be more flexibility to retain juniper to define trails and meet other needs than in Alternatives 3 and 5. Very few areas would be closed seasonally to motorized use (i.e., only the Tumalo and Northwest blocks). While this provides better conditions for recreational access to a wide range of visitors, there are fewer opportunities for non-motorized use on trails or areas reserved solely for this use (see non-motorized effect section, above).

Cumulative Effects
The combination of year-round use in South Millican, North Millican and Millican Plateau may decrease the amount of use pressure for motorized trail activities on other BLM-administered lands in the planning area and on BLM lands to the east of the

planning area. Although trails are specifically not designated to connect South Millican to the East Fort Rock OHV system, the use of South Millican year-round may increase the likelihood that the use of both South Millican and East Fort Rock trail systems would increase.

The emphasis on shared use roads and trails for this alternative, the increasing amounts of new development on inholdings or adjacent to BLM-administered lands, may increase user conflicts among recreational visitors and between public land visitors and adjacent landowners.

Conclusions
Alternative 2 provides for some separation of recreational user types, although at a lower level than the other action alternatives. Areas managed specifically for non-motorized use opportunities are relatively small, and relate more towards interpretive opportunities or special resource concerns rather than provision of non-motorized trails. In general, Alternative 2 provides a high degree of access, and responds well to the demand for road and trail access during the winter season, when recreational use in many areas is high. This alternative does not provide a high degree of diversity of recreation opportunities, and in areas that already receive high levels of use (e.g., Cline Buttes), may create a management setting that results in increased conflicts both between recreational users and between public land visitors and adjacent landowners.

Alternative 3

Special Recreation Area Designations
Same as Common to Alternatives 2-7

Travel Management/Recreation Emphasis Designations
The recreation emphasis varies by area in Alternative 3. The largest percentage (39 percent) of the planning area is still managed for multiple use on shared road and trail facilities (the Bend-Redmond block and Millican Valley). About 20 percent of the area is managed exclusively for non-motorized recreation use (a portion of Cline Buttes, Badlands WSA, Alfalfa ACEC, Tumalo block, and the lower Crooked River), while about 16 percent of the area is managed with an emphasis on motorized use only on roads, with trails provided for non-motorized use (Mayfield, Horse Ridge, and Skeleton Fire areas). The largest blocks of land closed to motor vehicles and managed for non-motorized trail use include the Badlands WSA and an area on both sides of the Chimney Rock segment of the lower Crooked River. Cline Buttes and Steamboat Rock blocks require intensive management for multiple uses on separated road or trail systems. About 18 percent of the area is Closed to motorized use year-round; only Alternative 6 closed more acreage. About 22 percent of the area has seasonal restrictions on motorized use, which is about in the middle of the range of alternatives; however, this alternative does close an additional portion of Millican Valley under heavier snow conditions. During seasonal closure periods in the Millican Valley, motorized use would be managed on designated trails in the Millican Plateau, as well as in the Bend-Redmond block and on separate trail systems in a portion of Cline Buttes.

In the La Pine area, Alternative 3 would represent a major change in management emphasis compared to the current Open designation. Most BLM-administered lands in La Pine would be closed to motorized trail use, except for the area between the Rosland OHV play area and the Deschutes National Forest. Small isolated parcels would be Closed to all motorized use.

Areas that receive the most intensive, high-cost management resources (an area with motorized and non-motorized uses separated on different road or trail systems) comprise a fairly high 23 percent of the planning area.

22 percent of the planning area is seasonally closed to motorized use, while 18 percent is closed year-round to motorized use.

Specific effects to recreational activities are described below:

Motorized Use (Roads and Trails)
Alternative 3 provides fewer motorized trail opportunities than Alternatives 1, 2, 4, and 7. During winter periods with heavy snowfall, the closed area in Millican Valley would increase to include Millican Plateau south of Reservoir Road. In these conditions, use would likely be concentrated in the Bend-Redmond block. Given the acreage closed year-round to motorized use in Cline Buttes and this alternative's emphasis on allowing motorized use mainly on roads in Cline Buttes, this area would not be able to offset the seasonal closures in Millican Valley as well as most other alternatives. Management of Cline Buttes, coupled with seasonal restrictions in South Millican, North Millican, and possible snow closures in a portion of Millican Plateau would place the highest amount of use pressure of all alternatives on trails in the Bend-Redmond block. There would also be a tendency for motorized use to increase on BLM lands east of the planning area, as recreationists use roads and trails in this area to create longer distance riding opportunities for themselves. This alternative would result in the greatest amount of crowding in the Millican Plateau area, although as with all action alternatives, there would be an increase in trails in this area and an increase in the quality of the riding experience as the existing non-designated system is developed into a useable, designated system. During the winter, Alternative 3 would likely result in the relatively heavy motorized use levels in Cline Buttes, higher than most alternatives, but likely slightly lower than Alternative 5.

For Alternative 3, the size and dispersal of Closed areas would have a moderate effect on motorized recreation use, compared with the other alternatives. Blocks of land in Cline Buttes, south of Alfalfa Market Road, adjacent to Prineville Reservoir and throughout La Pine that currently are open to cross-country travel and well-used for motorized recreation would be closed to this use altogether. Unlike Alternative 2, these blocks are relatively large. While the Tumalo block is also closed to motorized use, the area is currently seasonally closed, and does not receive consistent high levels of motorized use, so the effect of closing this area would be less than the areas described above.

The location and dispersal of motorized trail use areas would provide opportunities for trail use close to Bend, Redmond and Prineville, but less easily accessible opportunities west of Redmond, at La Pine, and near Prineville Reservoir. Whereas most of the La Pine area is currently designated as Open to cross-country OHV use, in Alternative 3, almost all BLM-administered land would be off-limits to motorized trail development. This would concentrate use in a small area of designated trails adjacent to the Rosland OHV area, likely increasing user conflicts among OHV users. The lack of OHV opportunities in La Pine may increase the use of the East Fort Rock trail system on the Deschutes National Forest, or increase the use of USFS managed lands adjacent to La Pine.

For general, motorized access that supports a variety of recreation uses (i.e., sightseeing, rockhounding, target shooting, etc.), Alternative 3 provides the lowest degree of access and user choice, since more the planning area is either closed to motorized use, or closed to motorized use seasonally. This alternative provides the least amount of motorized recreation opportunities in the Badlands WSA, with no routes being open to motorized use at any time (See Table 4-23). Alternative 3 would represent a diverse set of hunting opportunities, as there would be more areas with restricted access and primitive hunting opportunities than Alternative 1, 2, 4, and 5. The seasonal and year-round closures in Alternative 3 would pose some difficulties for some hunting access, particularly for game retrieval.

Non-Motorized Use (Roads and Trails)
Alternative 3 provides more opportunities for non-motorized trail use than Alternatives 1, 2, 4, 5, and 7. Relatively large areas would be available for development of non-motorized trails, such as Mayfield, Tumalo, all of Cline Buttes, the Horse Ridge/Skeleton Fire area, and most of the area surrounding Prineville Reservoir. Many of these areas would represent high intensity recreation management settings, with BLM's role in separating users on different road or trail systems requiring major investments in the recreation program for the Prineville District. The Badlands WSA would be closed to motorized and mechanized use, and while the area would continue to be popular for hiking and horseback riding, the layout of the route system defined by wilderness inventory would continue to limit the usefulness of the area for many trail dependent activities.

Like alternative 1, the seasonal trail closures in South Millican and North Millican areas could conceivably supply opportunities for non-motorized trail use in a setting that avoids user conflicts. Alternative 3 provides the highest degree of non-motorized trail emphasis in the area east of Bend, particularly in the winter/early spring. During this period, the Mayfield Area, Badlands WSA, Skeleton Fire area, Horse Ridge, South Millican, and North Millican would be available only for non-motorized trail use.

Under this alternative, larger areas that could support well laid out non-motorized trails would include the Skeleton Fire/Horse Ridge areas, the Mayfield Area, and the Cline Buttes area between Cline Falls Highway and the Deschutes River. Mountain bike opportunities would be increased by the development of designated trail systems tailored to non-motorized users in these areas. The upper portions of Cline Buttes would continue to be a challenge in development of a designated trail system, due to the large amount of private land and corresponding lack of trail continuity.

The location and dispersal of non-motorized trail use areas would provide opportunities for trail use close to Bend, Redmond and Prineville.

Special Recreation Permits/Group Uses
The provision of both motorized and non-motorized designated trails throughout the planning area would allow for greater ease in issuing special recreation permits for trail dependent uses, including commercial, competitive and group use. This benefit would likely be greatest for non-motorized events, given the large amount of the planning area devoted to this use, particularly in the wintertime. SRPs for motorized events would be focused on Millican Plateau. While the Bend-Redmond block would be available for this use, the fragmented nature of the area and reasonably foreseeable development may limit the area's usefulness for motorized commercial, competitive, or organized group events. Non-motorized SRP use would be accommodated year-round in the Skeleton Fire and Horse Ridge areas, where trails would be provided exclusively for non-motorized use and where demand currently is relatively high. To some extent, development of trails in these areas may take some use pressure off the Deschutes National Forest, which currently provides many more recreation permit and event permit opportunities.

Rock Climbing
Rock climbing opportunities would be managed similar to most of the other action alternatives. The Sisters Climbing area would be managed for climbing opportunities specifically. Alternative 3 would eliminate sport climbing at Pictograph Cave, at least for the short-term; until a site-specific management plan could be prepared (see also Caving/Cave Dependant Recreation, below).

Interpretive Use
As with the other action alternatives, several additional areas would be designated for interpretive use, including an enlarged Wagon Roads ACEC, and a Tumalo Canal ACEC. These areas would be managed specifically for interpretive use, and would be

identifiable areas that could conceivably get a large amount of hiking, sightseeing and interpretive use. Like Alternative 7, Alternative 3 provides the greatest amount of area that could conceivably be oriented toward natural resource interpretation, particularly juniper woodlands interpretation. These areas would include the Alfalfa ACEC area south of Alfalfa Market Road and the Cline Buttes area between Cline Falls Highway and the Deschutes River, which would be managed exclusively for non-motorized recreation.

Caving/Cave Dependent Recreation
All Significant Caves and caves currently nominated for Significance under the FCRPA would be closed to all visitation until cave management plans are prepared. The effects to recreational use would likely be greatest at Pictograph Cave and Redmond Caves, because these are the most well known caves on BLM lands in the planning area. The closure of Redmond Caves would require significant management resources, as these caves are easily accessible and located in an urban setting. The closure of Pictograph Cave would generally continue the existing management direction. Under this management, the opportunity for sport climbing (bolt protected, technical routes) would essentially be eliminated in the Arnold Lava Tube system both on USFS and BLM lands, although bouldering opportunities would remain in some USFS caves. Alternative 3 does allow for interpretive use of Pictograph Cave under SRP provisions contained in Common to Alternatives 2-7.

OMD Use
Under this alternative, OMD's permitted use area would be relatively small, and concentrated in the Bend-Redmond block. The combination of this military use alternative and travel management restrictions in Cline Buttes and North/South Millican may result in higher levels of conflict between OMD and recreational use in the Bend-Redmond block than other alternatives.

Alternative 3 does not provide additional training areas (i.e., Steamboat Rock and Millican) for the OMD. While potential conflicts with recreation use in these areas would be avoided, the BLM would lose any partnership opportunities with OMD to improve resource and recreation conditions in these areas. The lack of these partnership opportunities may have a long-term negative effect on recreation, as the management costs of these areas continue to rise with the region's population growth.

Wildlife and Wildlife Habitat Management
Wildlife management goals in Alternative 3 provide greater restrictions for public access and recreation than all other alternatives. The emphasis on historic distribution of source habitats and highest high (compared to all other alternatives) acreage with primary wildlife management emphasis results in greater acreages closed to motorized recreation during the winter. While all action alternatives call for restoration of sage grouse habitat by thinning/cutting juniper to increase sagebrush steppe plant communities, there would be less flexibility to retain juniper to define trails and meet other needs than in Alternatives 1, 2, 4, 5, and 7.

A major component of the existing Millican Valley OHV trail system would be closed during the winter. Although this may provide benefits to wildlife, the result may be increased crowding on trails in Millican Plateau or other areas (see Recreation, Motorized Use, above). Restrictions on motorized use to achieve wildlife management objectives do provide an opportunity to provide non-motorized trails in some areas. However, as noted previously in the Common to Alternatives 2-7 section, the design and implementation of non-motorized trails (done in subsequent area or project specific planning) in these areas may be limited by the primary wildlife management emphasis designation made in the UDRMP.

Cumulative Impacts
The regulations on rockclimbing, establishment of bolt protected routes, and bouldering adopted by the USFS in the Road 18 Caves Project EA would, when combined with the closure at Pictograph Cave, eliminate most opportunities for sport route climbing in caves close to Bend. Some bouldering opportunities would remain. This would reduce the diversity of climbing opportunities somewhat in Central Oregon.

The seasonal closures in North Millican, South Millican, and possible snow closures in Millican Plateau, combined with the management strategies in Cline Buttes, may tend to increase motorized trail use in the Bend-Redmond block or in areas not managed for this use. This alternative has the potential to increase motorized use levels on BLM-administered lands to the east of the planning area.

Alternative 3 does not identify many motorized trail opportunities surrounding Prineville Reservoir. The potential for increased recreational development at Prineville Reservoir and increased residential development at Prineville Reservoir State Park (including south of the reservoir) may result in motorized trail use in areas not identified or managed for such use. Much of the area surrounding Prineville Reservoir is managed for motorized use on roads only. Considering the increased development of the area, user conflicts may occur between recreationists and others sharing a limited road system.

The paving/upgrading of Millican/West Butte Road may result in greater numbers and diversity of recreation use, particularly during the winter closure period.

Conclusions
Alternative 3 provides for a more diverse set of recreation opportunities than Alternatives 1, 2, and 4 – with greater separation of users and more marked differences in how geographic areas are managed for recreation (mainly road and trail use). The combination of year-round or seasonal closures to motorized trail use east of Bend (Badlands, Horse Ridge, South Millican, North Millican, Mayfield) and separation of motorized vs. non-motorized uses on different trails in Cline Buttes and Steamboat Rock would tend to reduce motorized trail riding opportunities greater than other alternatives and increase the motorized trail use in areas where BLM would be required to maintain and enforce separate uses on trails within an area.

Alternative 4

Special Recreation Area Designations
Same as Common to Alternatives 2-7

Travel Management/Recreation Emphasis Designations
Alternative 4 provides a mix of recreation opportunities, but closes relatively few areas to all motorized use and instead relies more on limiting motorized use to roads in areas where non-motorized trails are provided. Approximately 67 percent of the planning area is still managed for multiple use on a shared system of roads and trails (including most of Cline Buttes, Bend-Redmond, and Millican Valley). Areas that allow motorized use on designated roads only (23 percent), while emphasizing non-motorized recreation on designated trails include the Northwest (Squaw Creek), Tumalo, Maston Allotment, Alfalfa ACEC, Badlands, Skeleton Fire, Horse Ridge, South Millican, and areas south of Prineville Reservoir. Seasonal closures to motorized use occur in the Northwest (Squaw Creek), Tumalo, Badlands, and Highway areas. The West Butte Road would form the boundary between different seasons of use in Millican Valley. The largest closed area managed exclusively for non-motorized trail use is an area north of Prineville Reservoir and east of the Crooked River, which would include trail connections between the Wild and Scenic River corridor and Prineville State Park. The North Millican area west of West

Butte Road would be open a month later each season, allowing for riding opportunities in December. The area east of West Butte Road would be open year-round. However, under this alternative, the South Millican area would be closed to motorized trail use.

The La Pine area would receive more active recreation management that the current direction, with most of the area changing from an Open designation to a network of designated roads and trails. The northern 1/3 of the area (near La Pine State Park) would be managed for motorized use on designated roads only.

Areas that receive the most intensive, high-cost management resources (areas with motorized and non-motorized uses separated on different road or trail systems) comprise about 23 percent of the planning area. These areas include the Skeleton Fire area, Horse Ridge, South Millican, the Maston allotment in Cline Buttes, the Northwest (Squaw Creek), and Tumalo areas. Most of these are areas that limit motorized use to roads and provide trails for non-motorized use, which may be slightly less difficult to manage than separate trail systems for each user type as proposed in Alternatives 3, 5, and 6.

Sixteen percent of the planning area would be seasonally closed to motorized use, while about 6 percent would be closed year-round to motorized use.

Specific effects to recreational activities are described below:

Motorized Use (Roads and Trails)
Alternative 4 is similar to Alternative 2 in that it provides for a high degree of motorized access and designated motorized trail opportunities throughout the planning area. While Alternative 4 provides less motorized recreation opportunities than Alternative 2, it provides more than any of the other action alternatives. Unlike Alternative 2, several areas are closed seasonally to motorized use, including the Badlands WSA and a portion of the North Millican area located between State Highway 20 West Butte Road and the southern Badlands WSA boundary. Additionally the entire South Millican OHV area would be closed to motorized trail use, resulting in a loss of about 12 miles of trails and approximately 29 miles of road use opportunities. However, Alternative 4 does provide direction for increasing trail mileage in North Millican and the Millican Plateau areas. Additionally, the loss of trail miles in South Millican may be also somewhat offset by an increase in motorized trail emphasis in the Cline Buttes area over alternatives 3, 6 and 7. As with Alternative 2, this alternative provides some motorized trail opportunities north of Prineville Reservoir, in an area where residents do not have easy access to the Millican Valley OHV trail system.

Of all the alternatives, Alternative 4 is the only one that separates management strategies for North Millican based on the location of the Millican/West Butte Road. The implementation of this seasonal closure would be relatively easier than most seasonal closures for this area in other alternatives, because it is based on an easily recognizable boundary, and applied at the relatively few grade separated crossings that will likely be built during the Millican/West Butte Road project.

Alternative 4 does provide for greater motorized trail development in La Pine, concentrating non-motorized trail emphasis near La Pine State Park. Alternative 4 would be less likely to increase motorized trail use on adjacent USFS land than Alternatives 3, 5, 6, and 7 – which all place greater restrictions on this use on BLM-administered lands. Alternative 4 does increase the likelihood for user conflicts, particularly between recreationists and adjacent landowners (see also Fuels/WUI Treatments, Common to Alternatives 2-7).

For general, motorized access that supports a variety of recreation uses (i.e., sightseeing, rockhounding, target shooting, etc.), Alternative 4 provides a relatively high degree of access and user choice, since motorized use is managed for a road emphasis in

many areas (i.e., no motorized trails) instead of closing areas to all motorized use. Approximately half (23.4 miles) of the routes in the Badlands WSA would be open to motorized use seasonally (See Table 4-23).

Non-Motorized Use (Roads and Trails)
Like Alternative 2, this alternative provides relatively few areas for exclusive, non-motorized use. Instead, Alternative 4 relies on managing certain areas for non-motorized trail use, while keeping these areas open to motorized use on roads only. These areas would include the Horse Ridge/Skeleton Fire areas, Cline Buttes between Cline Falls Highway and the Deschutes River, the area south of Prineville Reservoir, and the Northwest and Tumalo blocks.

Alternative 4 does provide an increase in non-motorized trail emphasis over the current planning paradigm; however, the dispersal and extent of these areas may not serve the demand as well as other alternatives, particularly for areas of natural solitude and quiet that are managed exclusively for non-motorized trail use. However, if winter season trail use is considered, then Alternative 4 does provide a relatively large block of land available to non-motorized road and trail use from January through April 30. This area would include the Badlands WSA, North Millican west of West Butte Road, and the Skeleton Fire/Horse Ridge area (South Millican would be non-motorized trail use year-round). Although some motorized use would occur on non-BLM roads in areas, this area would provide non-motorized recreation opportunities seasonally. Since the overall management strategy of Alternative 4 is to provide non-motorized trail use in the winter while keeping motor vehicles limited to roads, it is highly dependent on the BLM to actively manage, patrol, and enforce this separation of users.

Special Recreation Permits/Group Uses
The provision of both motorized and non-motorized designated trails throughout the planning area would allow for greater ease in issuing special recreation permits for trail dependent uses, including commercial, competitive and group use. This benefit would likely be greatest for motorized events, given the large amount of the planning area devoted to this use year-round. Given this focus, this alternative may create management issues and user conflicts as trails in some areas may be closed to motorized use during non-motorized events. SRPs for motorized events would be focused on the North Millican and Millican Plateau areas. While the Bend-Redmond and Mayfield blocks would be available for this use, the fragmented nature of the area and reasonably foreseeable development may limit the area's usefulness for motorized commercial, competitive, or organized group events. Non-motorized SRP use would be accommodated year-round in the Skeleton Fire and Horse Ridge areas, where trails would be provided exclusively for non-motorized use and where demand currently is relatively high. To some extent, development of trails in these areas may take some use pressure off the Deschutes National Forest, which currently provides many more recreation permit and event permit opportunities. The demand for special recreation permits for non-motorized trail events is also high in Cline Buttes and likely will increase in the Bend-Redmond and Millican Plateau or Mayfield areas with the development of new resorts.

Rock Climbing
Rock climbing opportunities would be managed similar to most of the other action alternatives. The Sisters Climbing area would be managed for climbing opportunities specifically. Pictograph Cave would remain available for the installation of sport climbing routes with few, if any, restrictions. Although the difficulty of these routes may limit visitation somewhat, the fact that Pictograph Cave would be the only cave open to sport climbing in the Arnold Lava Tube system would tend to increase visitation over time (see also Caving/Cave Dependant Recreation, below).

Interpretive Use
This alternative provides similar opportunities for interpretive services as Alternative 3. As with the other action alternatives, several additional areas would be designated for interpretive use, including an enlarged Wagon Roads ACEC, and a Tumalo Canal ACEC. These areas would be managed specifically for interpretive use, and would be identifiable areas that could conceivably get a large amount of hiking, sightseeing and interpretive use. Like Alternative 7, Alternative 3 provides the greatest amount of area that could conceivably be oriented toward natural resource interpretation, particularly juniper woodlands interpretation. These areas would include the Alfalfa ACEC area south of Alfalfa Market Road and the Cline Buttes area between Cline Falls Highway and the Deschutes River, which would be managed with an emphasis on non-motorized recreation.

Caving/Cave Dependant Recreation
Pictograph Cave would remain specifically available for the installation of sport climbing routes, with little or no management direction. Although the difficulty of these routes may limit visitation somewhat, the fact that Pictograph Cave would be the only cave open to sport climbing (bolt protected routes) in the Arnold Lava Tube system would tend to increase visitation over time. Pictograph Cave would be closed seasonally to all visitors, which would reduce cave recreation opportunities on BLM land somewhat; since Pictograph Cave is one of the larger caves located on BLM managed lands. However, there would still be opportunities for caving on BLM managed land and at the lava tubes more prevalent on USFS, DNF lands.

WUI/Fuels Management
The combination of WUI treatments and emphasis on designated road and trail systems for motorized use (with or without seasonal closures) throughout the planning area may tend to increase conflicts between recreation use and adjacent landowners. Areas with an Heavy concentration of WUI treatments (e.g., La Pine) and those managed with seasonal closures would present particular difficulties, as the boundary between BLM and private lands are cleared and more accessible, and communication and enforcement of seasonal closures becomes more difficult.

OMD Use
OMD's permitted use area would include the Bend-Redmond block and a portion of the Mayfield block. Alternative 4 provides relatively good seasonal access and trail system acreage in the Millican Valley area (notwithstanding the closure of all motorized trails in South Millican) and in Cline Buttes, so the level of use in the Bend-Redmond block may be lower than some other alternatives and the conflicts between OMD's use and trail use may be less pronounced.

Alternative 4, like Alternatives 1, 2, and 3, does not provide new areas for OMD training (e.g., Steamboat Rock, Millican Plateau). While potential conflicts with recreation use in these areas would be avoided, the BLM would lose any partnership opportunities with OMD to improve resource and recreation conditions in these areas. The lack of these partnership opportunities may have a long-term negative effect on recreation, as the management costs of these areas continue to rise with the region's population growth.

Wildlife and Wildlife Habitat Management
Wildlife management goals in Alternative 4 provide a moderate level of restrictions for public access and recreation among the action alternatives. The emphasis on current distribution of source habitats and moderate (compared to other action alternatives) acreage with primary wildlife management emphasis provides some flexibility for a wider range of recreation opportunities. In particular, this alternative allows for greater levels of road access that would support a variety of dispersed recreational use (camping, hunting, rockhounding, etc.) than alternatives that have greater acreage of year-round closures.

While Alternative 4 would provide direction for restoration of sage grouse habitat by thinning/cutting juniper to increase sagebrush steppe plant communities, there would be more flexibility to retain juniper to define trails and meet other needs than Alternatives 3 and 6.

Cumulative Effects
Alternative 4 closes the Badlands WSA and western half of North Millican to motorized use during the winter. This alternative also closes all motorized trail use in South Millican. These travel management policies and the paving of Millican/West Butte Road, would tend to increase the amount of use in the eastern half of North Millican and Millican Plateau, both for OHV use and general public access.

Conclusions
Alternative 4 provides more diversity of recreation settings than Alternative 1 or 2, but less than the remaining action alternatives. Alternative 4 relies most heavily on restricting motorized use to roads in the same areas where non-motorized trails are being provided. While there is an increase in non-motorized trail emphasis for the planning area compared to Alternatives 1 and 2, there are few areas managed exclusively for non-motorized use. Areas that are place under some type of restriction to motorized trail use are generally outlying areas, thus this alternative may have more social impacts and conflicts between public land visitors and adjacent landowners.

Alternative 5

Special Recreation Area Designations
Same as Common to Alternatives 2-7

Travel Management/Recreation Emphasis Designations
Alternative 5 provides a relatively high mixture of different recreation opportunities and varying management strategies/intensities. About 50 percent of the planning area is still managed for multiple use, primarily on shared roads and trails (Millican Valley and 3/4 of Cline Buttes). About 20 percent of the planning area would be managed for motorized use on roads only, while providing non-motorized trail opportunities. These areas would include the Northwest (Squaw Creek), Tumalo, Mayfield, Skeleton Fire areas; and the area south of Prineville Reservoir. A moderate amount of the planning area (approximately 12 percent) would be closed to motorized use and managed exclusively for non-motorized trail use. These areas include Horse Ridge, the Maston Allotment in Cline Buttes, the Steamboat Rock parcel, and a large area on both sides of the Chimney Rock segment of the lower Crooked River. The Bend-Redmond block would be intensively managed for multiple uses on separate trail systems. The North Millican area would be open for OHV use a month later to allow for riding opportunities in December.

The La Pine area would receive more active recreation management that the current direction, with most of the area changing from an Open designation to a network of designated roads and trails. The northern 1/3 of the area (near La Pine State Park) would be managed for motorized use on designated roads only.

Areas that receive the most intensive, high-cost management resources (areas with motorized and non-motorized uses separated on different road or trail systems) comprise about 31 percent of the planning area, the highest of all alternatives. These areas include the Bend-Redmond block, the Mayfield area, a portion of Cline Buttes, and the Skeleton Fire area.

26.7 percent of the planning area is seasonally closed to motorized use (Badlands WSA, North and South Millican), while about 12 percent is closed year-round to motorized use.

Specific effects to recreational activities are described below.

Motorized Use
Alternative 5 closes North Millican seasonally to motorized use; however, this closure starts a month later than the current seasonal closure, and would provide for an extra month of riding opportunities over Alternatives 1 and 3. Motorized use opportunities in the South Millican Area would also be improved since the seasonal closure in Alternative 5 allows for approximately 2 ½ months additional riding opportunities (including some winter use) over alternatives 1 and 3.

However, given the seasonal closure in North Millican and the direction to develop a less comprehensive motorized trail system in the Bend-Redmond block, this alternative has the potential to increase the use pressure for motorized trail use in the Cline Buttes area. Management direction in Cline Buttes would allow development of a motorized trail system, with fewer opportunities than Alternatives 1, 2 and 4, but more than Alternatives 6 and 7. During the winter, Alternative 5 may result in the heaviest motorized use levels in Cline Buttes of all alternatives.

For Alternative 5, the size and dispersal of Closed areas would have a moderate effect on motorized recreation use, compared to all other action alternatives. Areas closed to motorized use year-round in this alternative do not currently contain designated trails, and are generally small in size and not a regional draw for motorized recreation. Alternative 5 closes the Steamboat Rock to motorized use (except for the emergency access road into Crooked River Ranch). This measure would provide recreation opportunities for non-motorized trail use close to Redmond, reduce conflicts with adjacent subdivisions, and create the most realistic solution to the chronic dumping problems experienced in the Steamboat Rock block.

For general, motorized access that supports a variety of recreation uses (i.e., sightseeing, rockhounding, target shooting, etc.), Alternative 5 provides a moderate degree of access and user choice. The majority of the planning area would be open to motorized use on designated roads or designated roads and trails, with seasonal restrictions applying mostly in the more rural, eastern portions of the planning area. Motorized access in the Badlands WSA would fall in about the middle range of alternatives, with no routes being open year-round, and slightly less than half the inventoried routes (17.7 miles) open seasonally (See Table 4-23). During the motorized use closure period, motor vehicle use on designated, inventoried routes would be allowed for legal game retrieval purposes. This provision would provide for easier use of the area by hunters.

Non-Motorized Use
Alternative 5 provides direction for provision of non-motorized trails in the Skeleton Fire/Horse Ridge area, in portions of Cline Buttes, Mayfield Area, in areas around Prineville Reservoir, in the Steamboat Rock area, and in the Bend-Redmond block. Along with alternative 3 and 6, this alternative provides a relatively high amount of non-motorized trail emphasis over the planning area. These opportunities would be dispersed throughout the planning area. The Skeleton Fire/Horse Ridge, Mayfield, and Bend-Redmond blocks would offer opportunities close to Bend. Portions of Cline Buttes, the Steamboat Rock area and the Bend-Redmond block would provide opportunities close to Redmond. The Chimney Rock area north of Prineville Reservoir would offer these opportunities close to Prineville.

In comparison to Alternatives 3 and 7, Alternative 5 offers fewer opportunities for non-motorized trail use in areas managed exclusively for this use. Longer trail systems for non-motorized use would be created in the Bend-Redmond block – this direction is unique among all the alternatives. The management of the Bend-Redmond block may allow for development of interpretive trails along the roads in the Wagon Roads ACEC that connect to other non-motorized trails in the area. The actual management

of the Bend-Redmond block would be fairly intensive, since BLM would charged with separating different trail users (i.e., motorized and non-motorized) on separate trail systems.

Rock Climbing
Rock climbing opportunities would be managed similar to most of the other action alternatives. The Sisters Climbing area would be managed for climbing opportunities specifically. Sport route climbing opportunities in Pictograph Cave would be eliminated (see Caving and Cave Dependent Recreation section, and Cumulative Impacts Section)

Special Recreation Permits/Group Uses
The provision of both motorized and non-motorized designated trails throughout the planning area would allow for greater ease in issuing special recreation permits for trail dependent uses, including commercial, competitive and group use. While the Bend-Redmond and Mayfield blocks would be available for this use, the fragmented nature of the area and reasonably foreseeable development may limit the area's usefulness for motorized commercial, competitive, or organized group events. Non-motorized SRP use would be accommodated year-round in the Skeleton Fire/Horse Ridge, Smith Rock and portions of Cline Buttes areas, where trails would be provided exclusively for non-motorized use and where demand currently is relatively high. To some extent, development of trails in these areas may take some use pressure off the Deschutes National Forest, which currently provides many more recreation permit and event permit opportunities. Alternative 5 creates additional opportunities for non-motorized SRP use, including use of areas such as the Bend-Redmond block and the area along the Chimney Rock segment of the Lower Crooked Wild and Scenic River. Although these areas are not currently in high demand for SRP authorizations, the development of trails in these areas would likely increase applications for outfitter/guide use.

Interpretive Use
This alternative provides similar opportunities for interpretive services as Alternative 3 and 7. As with the other action alternatives, several additional areas would be designated for interpretive use, including an enlarged Wagon Roads ACEC, and a Tumalo Canal ACEC. These areas would be managed specifically for interpretive use, and would be identifiable areas that could conceivably get a large amount of hiking, sightseeing and interpretive use. Like Alternative 6, Alternative 5 provides fewer areas than Alternatives 3 and 7 for non-motorized use that also are designated ACECs and may conceivably be oriented toward natural resource interpretation, particularly juniper woodlands interpretation. The travel management applied to the Bend-Redmond block would provide conditions most conducive to development of an interpretive trail system using historic roads and the north unit canal, although this use would not be precluded in any other alternative.

Caving/Cave Dependant Recreation
Under this alternative, Pictograph Cave would be closed to installation of bolted routes; therefore, the opportunity for sport climbing (bolt protected, technical routes) would essentially be eliminated in the Arnold Lava Tube system both on USFS and BLM lands, although bouldering opportunities would remain in some caves. Visitation to Pictograph Cave would be closed seasonally (from October 15 to May 1) annually. This would reduce caving opportunities on BLM managed lands somewhat, since Pictograph Cave is one of the larger caves located on BLM managed lands. However, there would still be opportunities for caving on BLM managed land and at the lava tubes more prevalent on USFS, DNF lands.

OMD Use
The OMD would be authorized to use an area in the Bend-Redmond block and a portion of the Mayfield area. The provision of both motorized and non-motorized trails in the

Bend-Redmond block assumes a fairly high level of management intensity, which if implemented, may reduce conflicts between OMD use and recreation.

Alternative 5 does not provide additional training areas (i.e., Steamboat Rock and Millican) for the OMD. While potential conflicts with recreation use in these areas would be avoided, the BLM would lose any partnership opportunities with OMD to improve resource and recreation conditions in these areas. The lack of these partnership opportunities may have a long-term negative effect on recreation, as the management costs of these areas continue to rise with the region's population growth.

Wildlife and Wildlife Habitat Management

Alternative 5 identifies fewer areas as primary wildlife emphasis than Alternatives 3, 4, 6, and 7, but more than Alternatives 1 and 2. Wildlife management goals in Alternative 5 provide a moderate level of restrictions for public access and recreation among the action alternatives. The emphasis on current distribution of source habitats and moderate (compared to other action alternatives) acreage with primary wildlife management emphasis provides some flexibility for a wider range of recreation opportunities.

While Alternative 5 would provide direction for restoration of sage grouse habitat by thinning/cutting juniper to increase sagebrush steppe plant communities, there would be more flexibility to retain juniper to define trails and meet other needs than Alternatives 3 and 6.

Cumulative Effects

The regulations on rockclimbing, establishment of bolt protected routes, and bouldering adopted by the USFS in the Road 18 Caves Project EA would, when combined with the closure at Pictograph Cave, eliminate most opportunities for sport route climbing in caves close to Bend. Some bouldering opportunities would remain. This would reduce the diversity of climbing opportunities somewhat in Central Oregon.

The seasonal closures in North Millican and South Millican, combined with the management strategy in Mayfield and Bend-Redmond blocks, may tend to increase motorized trail use in the Cline Buttes area. This alternative has the potential to increase motorized use levels on BLM-administered lands to the east of the planning area.

Alternative 5 does not provide motorized trail opportunities surrounding Prineville Reservoir. The potential for increased recreational development at Prineville Reservoir and increased residential development at Prineville Reservoir State Park (including south of the reservoir) may result in motorized trail use in areas not identified or managed for such use. Much of the area surrounding Prineville Reservoir is managed for motorized use on roads only. Considering the increased development of the area, user conflicts may occur between recreationists and others sharing a limited road system.

The paving/upgrading of Millican/West Butte Road may result in greater numbers and diversity of recreation use, particularly during the winter closure period.

Conclusions

Alternative 5 provides a relatively high diversity of recreation opportunities, with some areas managed exclusively for non-motorized use, some areas managed for shared use trails, and other areas managed for motorized use on roads while developing separate non-motorized trails. This alternative places an intensive, higher cost recreation management strategy on the Bend-Redmond block than all other alternatives. Although the seasonal closures in North and South Millican do allow for a small amount of wintertime use, this alternative would still represent a shift in motorized use to Millican Plateau and Cline Buttes.

Alternative 6

Special Recreation Area Designations
Same as Common to Alternatives 2-7

Travel Management/Recreation Emphasis Designations
Like Alternative 5, this alternative provides a relatively high mixture of different recreation opportunities and varying management strategies/intensities. As compared to Alternative 5, a slightly smaller portion (40 percent) of the planning area is still managed for multiple use primarily on shared roads and trails (Millican Valley and Bend-Redmond areas). A slightly smaller portion (17 percent) of the planning area would be managed for motorized use on roads only, while providing non-motorized trail opportunities. These areas would include the Northwest (Squaw Creek), Steamboat Rock parcel, and Skeleton Fire areas; and the area south of Prineville Reservoir. Alternative 6 closes the highest percentage of the area to motorized use year-round (19.5 percent), and most of these areas would be managed for non-motorized trail use. Unlike all other alternatives, one large block of land including the Badlands WSA, a portion of the North Millican OHV area, and Horse Ridge would be closed to motorized use year-round. This alternative also proposes the most intensive and high cost management strategy for Cline Buttes, essentially limiting motorized travel to designated roads while providing designated trails for non-motorized users. The North Millican area would be closed during the winter and early spring, resulting in increased use of Millican Plateau, Bend-Redmond, and Mayfield areas for OHV use.

Alternative 6 represents the largest shift in management emphasis for the La Pine area. Like Alternative 3, the entire area surrounding La Pine would be closed to motorized trail use. Further, in this alternative, the southern half of the area would be closed to all motorized use (roads and trails) seasonally. The corridor connecting the Rosland OHV play area to the Deschutes National Forest would be retained for year-round OHV use.

Areas that receive the most intensive, high-cost management resources (areas with motorized and non-motorized uses separated on different road or trail systems) comprise about 22 percent of the planning area. These include the entire Cline Buttes block, the Steamboat Rock parcel, and the Skeleton Fire area. All these areas currently receive relatively high levels of use that are expected to increase.

28 percent of the planning area is seasonally closed to motorized use, while close to 20 percent is closed year-round to motorized use.

Specific effects to recreational activities are described below.

Motorized Use
Alternative 6 provides the least amount of acreage for motorized trail recreation of all alternatives, particularly during the winter, when approximately 43 percent of the planning area would be closed to motorized use. The use of the existing Millican Valley OHV area would be compromised somewhat by the designation of 5,000 acres in North Millican as Closed year-round to motor vehicles. In addition, the seasonal closure applied to the remainder of the North Millican area would increase the closed period by 2 months over the current (Alternative 1) condition. The effect of these travel management decisions on motorized recreation would be to move more use into a smaller area of trails in Millican Plateau or to the Bend-Redmond or Cline Buttes areas, or further east on BLM managed lands outside the planning area. To some extent, use would be displaced to the East Fort Rock trail system on the DNF during mild winters. This alternative would likely have the greatest effect on user conflicts and management intensity at Cline Buttes, which under this alternative would have motorized use restricted to a fairly

limited travel network that emphasizes roads over trails. BLM would be charged with maintaining motorized use on a relatively small system and keeping the designated non-motorized trail system in the same area reserved for this use.

The Bend-Redmond block would remain available for motorized trail development; however, the fragmentation of this area by canals, ACEC roads, paved public roads, and likelihood of adjacent development would affect the ability for BLM to create a motorized trail system that offers high quality recreation experiences and enough trails for an entire day of riding.

For general, motorized access that supports a variety of recreation uses (i.e., sightseeing, rockhounding, target shooting, etc.), Alternative 6 provides a lower degree of access and user choice than all action alternatives except Alternative 7, since more of the planning area is either closed to motorized use or closed seasonally to motorized use. In addition, the direction to provide both motorized and non-motorized trails in Cline Buttes would likely result in fewer roads available for general public use. Motorized access in the Badlands WSA and a portion of the North Millican area would not be available at any time.

Non-Motorized Use

Alternative 6 creates a large block of land for exclusive motorized use comprised of the Badlands WSA, Horse Ridge, and a 5,000 acre area including Smith Canyon and Dry River Canyon. The combination of Badlands and the Smith Canyon/Dry Canyon area would provide opportunities for all day or weekend hike trips using inventoried routes in the Badlands and roads or future designated trails in the Smith Canyon/Dry River Canyon area and the Horse Ridge/Skeleton Fire area. The use of this entire area for non-motorized trails is somewhat limited by State Highway 20, which bisects these areas; however, some hikers and mountain bicyclists currently cross the highway to complete loops using Horse Ridge and Dry River Canyon.

While the Badlands/Smith Canyon and Horse Ridge areas would be highly visible and heavily used non-motorized recreation areas, the opportunities for non-motorized use in areas of solitude and natural quiet would be somewhat limited elsewhere in the planning area. Most of the more urban blocks of land would be managed for motorized use on roads or on roads and trails.

Alternative 6 is the only alternative to close the 32,221-acre Badlands WSA to mechanized use. This would close a fairly large area (8 percent of the planning area) to mountain bike use and use of horse-drawn carts. Both these activities take place in the Badlands, although the layout of the inventoried routes in the Badlands do not offer much variety in terms of route loops or challenging mountain bike opportunities. The combined closure of the Badlands to motorized vehicles and mechanized use (including game carts) would make it more difficult and strenuous to hunt. Some hunting use may be displaced.

Special Recreation Permits/Group Uses

The provision of both motorized and non-motorized designated trails throughout the planning area would allow for greater ease in issuing special recreation permits for trail dependent uses, including commercial, competitive and group use. While the Bend-Redmond and Mayfield blocks would be available for this use, the fragmented nature of the area and reasonably foreseeable development may limit the area's usefulness for motorized commercial, competitive, or organized group events. Non-motorized SRP use would be accommodated year-round in the Skeleton Fire/Horse Ridge, Smith Rock, Cline Buttes, Tumalo, and Crooked River/Chimney Rock areas, where trails would be provided exclusively for non-motorized use. To some extent, development of trails in these areas may take some use pressure off the Deschutes National Forest, which currently provides many more recreation permit and event permit opportunities.

Alternative 6 creates additional opportunities for non-motorized SRP use, including use of areas such as the area along the Chimney Rock segment of the Lower Crooked Wild and Scenic River and the Smith Canyon/Dry River Canyon areas. Although these areas are not currently in high demand for SRP authorizations, the development of trails in these areas would likely increase applications for outfitter/guide use. The issuance of SRPs for trail use that includes both the Smith Canyon/Dry River Canyon and the Badlands WSA would require an EA (based on IMP requirements). This may preclude full use of the potential trail opportunities in this area by outfitter/guides or organized groups.

Rock Climbing
The effects on rock climbing would be the same as Alternative 5.

Interpretive Use
As with the other action alternatives, several additional areas would be designated for interpretive use, including an enlarged Wagon Roads ACEC, and a Tumalo Canal ACEC. These areas would be managed specifically for interpretive use, and would be identifiable areas that could conceivably get a large amount of hiking, sightseeing and interpretive use. Like Alternative 5, Alternative 6 provides fewer areas than Alternatives 3 and 7 for non-motorized use that also are designated ACECs and may conceivably be oriented toward natural resource interpretation, particularly juniper woodlands interpretation.

Caving/Cave Dependant Recreation
The effects on caving/cave dependent recreation would be the same as Alternative 5.

OMD Use
Alternative 6 authorizes the OMD to use the largest and greatest range of lands of all the alternatives. These would include the Bend-Redmond block, a portion of the Mayfield area, Steamboat Rock area, and a portion of Millican Plateau. The combination of seasonal or year-round closures in North and South Millican, and the management strategy in Cline Buttes, would put an increased emphasis on motorized trail use in the Bend-Redmond block. This may result in some conflicts with OMD's use of their training area.

Alternative 6 provides additional training areas (i.e., Steamboat Rock and Millican) for the OMD. While potential conflicts with recreation use in these areas may occur in these areas, given the infrequent, rotational schedule of use for these areas, most conflicts could be avoided. The opportunity for the BLM to partner with the OMD in these areas may have long-term benefits to recreational use of these areas that outweigh any short-term effects of specific OMD training exercises.

Wildlife and Wildlife Habitat Management
Wildlife management goals in Alternative 6 provide slightly less restrictions for public access and recreation than Alternatives 3 and 7, but more than all other alternatives. The emphasis on historic distribution of source habitats and relatively high (compared to all other alternatives) acreage with primary wildlife management emphasis results in greater acreages closed to motorized recreation during the winter or year-round. While all action alternatives call for restoration of sage grouse habitat by thinning/cutting juniper to increase sagebrush steppe plant communities, there would be less flexibility to retain juniper to define trails and meet other needs than in Alternatives 1, 2, 4, 5, and 7.

A major component of the existing Millican Valley OHV trail system would be closed during the winter (along with a portion closed year-round). Although this may provide benefits to wildlife, the result may be increased crowding on trails in Millican Plateau or other areas. Restrictions on motorized use to achieve wildlife management objectives do provide an opportunity to provide non-motorized trails in some areas. However, as noted previously in the Common to Alternatives 2-7 section, the design

and implementation of non-motorized trails (done in subsequent area or project specific planning) in these areas may be limited by the primary wildlife management emphasis designation made in the UDRMP.

Cumulative Effects
The combination of travel management regulations for motorized use in the North Millican and Cline Buttes areas would likely increase the demands for motorized trail use in the Millican Plateau area, the Bend-Redmond block, USFS managed lands, and BLM-administered lands to the east of the planning area. The use pressure in the Bend-Redmond block may create some conflicts between OMD use and recreational use; however, these conflicts would likely be less than Alternative 3, because Alternative 6 provides a greater range of use areas for OMD. There would likely be greater conflicts between OMD use and recreational use in Millican Plateau for this alternative than most other action alternatives.

Conclusions
Alternative 6 closes the largest percentage of the planning area to motorized use during the winter. This would affect motorized recreation activities the greatest, although there would be less access for many different types of recreation. Alternative 6 does provide for a high diversity of recreation settings, with areas managed exclusively for non-motorized trail use, a mix of uses, or as shared use areas. The majority of the acreage closed to motorized use occurs east of Bend, comprised of the Badlands WSA, Horse Ridge, and the Smith Canyon/Dry River Canyon areas. This management strategy would provide non-motorized recreation opportunities relatively close to Bend, which would be a particular benefit in the wintertime. However, Alternative 6 does not provide these types of recreation opportunities close to Redmond. The management strategy for Cline Buttes would require a high commitment of planning, engineering, education and enforcement resources by the BLM.

Alternative 7

Special Recreation Area Designations
Same as Common to Alternatives 2-7

Travel Management/Recreation Emphasis Designations
Alternative 7 differs from Alternative 6 by providing winter OHV trail riding opportunities in the North Millican area, albeit on a greatly reduced trail system. Like Alternatives 5 and 6, this alternative provides a relatively high mixture of different recreation opportunities and varying management strategies/intensities. As compared to Alternative 6, a slightly smaller portion (37 percent) of the planning area is still managed for multiple use primarily on shared roads and trails (Millican Valley and Bend-Redmond areas). The reduction is a result of the Mayfield block's management changing to a roads only emphasis. Alternatives 6 and 7 provide about the same amount of lands managed for motorized use on roads only, while providing non-motorized trail opportunities. These areas would include the Northwest (Squaw Creek), and Skeleton Fire areas; and the area south of Prineville Reservoir. Alternative 6 closes the highest percentage of the area to motorized use year-round (19.5 percent) of any alternative. While most of these areas would be managed for non-motorized trail use, with the exception of the Badlands, these areas are relatively small and would not allow very lengthy trail systems for mountain bikes or horses. This alternative proposes one of the most intensive and high cost management strategy for Cline Buttes, providing separate trails and/or separate areas for motorized and non-motorized trail users. Motorized use is concentrated in the middle and north portion of the Cline Buttes block, and will likely result in increased conflicts between recreational visitors and private landowners. Like many other alternatives, the Steamboat Rock management strategy is also extremely management intensive. No opportunities for motorized use exist surrounding a broad area around Prineville Reservoir.

Alternative 7 represents a large shift in management emphasis for the La Pine area. Like Alternative 3, the entire area surrounding La Pine would be closed to motorized trail use. Further, in this alternative, the southern half of the area would be closed to all motorized use (roads and trails) seasonally. The corridor connecting the Rosland OHV play area to the Deschutes National Forest would be retained for year-round OHV use.

Alternative 7 has slightly less land closed seasonally than Alternative 6, due to North Millican being open year-round due to a greatly reduced trail density. However, approximately 16.5 percent of the planning area is closed seasonally during the winter, and 22.6 percent is closed year-round. This results in approximately 40 percent of the planning area being closed to motorized use during the winter. To a large degree, these closures are in outlying areas where BLM management is limited or non-existent.

Areas that receive the most intensive, high-cost management resources (areas with motorized and non-motorized uses separated on different road or trail systems) comprise about 30 percent of the planning area, one of the highest of all alternatives. These include most of the entire Cline Buttes block, the Steamboat Rock parcel, the Mayfield block, the area surrounding Prineville Reservoir, and the Skeleton Fire area. All these areas currently receive relatively high levels of use that are expected to increase.

16.5 percent of the planning area is seasonally closed to motorized use, while close to 23 percent is closed year-round to motorized use.

Specific effects to recreational activities are described below:

Motorized Use (Roads and Trails)
Alternative 7 provides more opportunities for motorized trail use than Alternatives 6, 3, and 5, but less than Alternative 1, 2, and 4. While this alternative keeps the North Millican area open year-round for motorized recreation, it calls for a reduction in trail density and the number of trail loops – to achieve a motorize use road and trail density of about 1.5 miles per square mile and large unfragmented blocks of land within the road and trail system. Like all action alternatives, the Dry River Canyon would remain as a non-motorized trail. While this alternative would reduce the quality of riding opportunities by decreasing trail miles and eliminating many options for riders to choose different loops and thus disperse use and reduce conflicts, the use of this area during the winter and early spring would provide OHV opportunities when there is a highest demand. As with Alternatives 2, 4, and to a lesser extent, 5 (which allows use in December), the ability for riders to use the North Millican area may reduce the demand for other BLM lands in the planning area or to the east.

Two other areas would be managed for motorized trail use in this alternative, the Bend-Redmond area, and a portion of Cline Buttes. For Cline Buttes, there would be reduction in trail miles over the current, unmanaged situation. OHV trails would be provided in the area between Barr Road and Fryrear Road and the area north of State Highway 126. However, the dry canyon complex in the western portion of the area would be closed to motorized trails, as would the area between Cline Falls Highway and the Deschutes River (the area east of Barr Road would generally not have many motorized trails, although the area is not explicitly closed to this use). Additionally, the creation of a designated trail system would be done to emphasize conflicts with private property. All these measures would contribute to a reduction in trail miles and likely result in a highly intensive management scenario. The provision of motorized trails in the central portion of Cline Buttes may also increase conflicts, as the available miles of trail system would be reduced and more encounters between recreationists would occur. If use levels increase over time, it is possible that the motorized trail system would become crowded enough where visitors begin to select other areas to ride that offer better opportunities. In

addition, the concentration of trails in the center portion of the area may increase conflicts with residents, although routing of trails to minimize conflicts with private landowners would be done.

Similar constraints would occur in the Bend-Redmond area, although this area is less affected by private land development. As with all action alternatives, both the Bend-Redmond and Cline Falls areas would generally only provide shorter riding opportunities close to the urban area when compared to the larger Millican Valley area.

The Steamboat Rock area would provide for shorter motorized trail opportunities.

Under this alternative, there would be no motorized trail opportunities surrounding Prineville Reservoir or available on BLM lands between Prineville and Prineville Reservoir.

For general, motorized access that supports a variety of recreation uses (i.e., sightseeing, rockhounding, target shooting, etc.), Alternative 7 provides a relatively low degree of access and user choice, since more of the planning area is either closed to motorized use or closed seasonally to motorized use. In addition, the direction to provide both motorized and non-motorized trails in Cline Buttes would likely result in fewer roads available for general public use. Motorized access in the Badlands WSA would not be available at any time (See Table 4-23).

Unlike any of the other action alternatives, Alternative 7 would decrease the number of roads in the North Millican area drastically in favor of designated trails. The reduction in roads in this area would affect general motorized access for a variety of recreationists, including sightseers, hunters, rockhounds, etc.

Alternative 7 provides a low level of motorized trail riding opportunities compared to Alternatives 1, 2, and 4. Alternative 7 does provide slightly more acreage for motorized trail use than Alternative 6.

Non-Motorized Use (Roads and Trails)
Alternative 7 would provide an increase in non-motorized trail opportunities, with about the same level of opportunities as Alternatives 6 and 3. Mechanized use would be allowed in the Badlands WSA, in contrast to Alternative 6, which does not allow these uses. However, the usefulness of the trail system in North Millican for non-motorized uses would be more limited in Alternative 7 than any other alternative, since these trails would be designed for very large loops that would not provide as high a quality mountain biking, hiking or equestrian conditions (see also SRP section). Management of the Tumalo block, Skeleton Fire/Horse Ridge area, Mayfield area, areas surrounding La Pine State Park, and areas surrounding Prineville Reservoir would all offer non-motorized trail opportunities. Certain portions of Cline Buttes would emphasize non-motorized trails, such as the Dry Canyon complex in the western portion of Cline Buttes, and the area east of Barr Road. As with other alternatives or areas that separate different types of trail users on different trails or areas within a geographic area, this alternative presents very high management challenges for the BLM.

Similar to alternatives 3, 5, and 6, this alternative would apply a non-motorized emphasis for recreation on all lands surrounding Prineville Reservoir. Like alternatives 3, 5, and 6, this would increase consistency with the recreation management goals of Prineville Reservoir State Park and the overall management goals of the Bureau of Reclamation.

Special Recreation Permits/Group Uses
As with all other action alternatives, the provision of designated trail systems throughout the planning area (as opposed to undesignated casual use networks) would increase the ability of the BLM to authorize commercial, competitive and group use. In contrast to

most other alternatives, Alternative 7 does place some restrictions on special recreation events in specific areas, either by limiting the types of events, their frequency, or the time of year permits would be granted. While these restrictions do limit the amount of special recreation permit use (mainly trail use events), they also may serve to speed up the processing of permits for events done within the confines of the RMP. Key effects of Special Recreation Event management in Alternative 7 include:

1. Opportunities for road and trail dependent events in South Millican would not be available at any time, except for the minimum road/trail use necessary to accomplish loops using designated road and trails in the Horse Ridge area. This would eliminate use of the South Millican area for OHV events.

2. Opportunities for road and trail dependent events on the multi-use trail system in North Millican would not be available from December 1 to April 30th. While site-specific events (e.g., events at ODOT Pit or Cinder Pit play areas) could occur during this period, this restriction would place more pressure on other areas such as Millican Plateau, Bend-Redmond, Cline Buttes, or USFS managed lands for special event use. During the remainder of the year, restrictions on the number of events, and their frequency would again put demands on other areas as the BLM tries to balance the demand for trail use events with available miles of trail system. If the trail designation measures in Alternative 7 are fully implemented, the effect of special event restrictions in North Millican would be minimized. Additionally, the trail system goals (long loops and unfragmented blocks) in North Millican would generally make this area less suitable for many (especially non-motorized) trail events, which require shorter loops.

3. The Skeleton Fire/Horse Ridge area would have a year-round limitation on the number and frequency of all road and trail dependent events. Given the emerging trend of this area receiving high levels of non-motorized trail use and the current frequency of requests for events, this alternative would require that BLM deny many requests or find other suitable locations, such as Cline Buttes or Mayfield for these activities. This limitation may also increase the requests for trail events in the Badlands WSA.

Rock Climbing
The effects on rock climbing would be the same as Alternative 5.

Interpretive Use
As with the other action alternatives, several additional areas would be designated for interpretive use, including an enlarged Wagon Roads ACEC, and a Tumalo Canal ACEC. These areas would be managed specifically for interpretive use, and would be identifiable areas that could conceivably get a large amount of hiking, sightseeing and interpretive use. Like Alternative 3, Alternative 7 provides the greatest amount of area that could conceivably be oriented toward natural resource interpretation, particularly juniper woodlands interpretation. These areas include the area south of Alfalfa Market Road and the Cline Buttes area between Cline Falls Highway and the Deschutes River, which would be managed exclusively for non-motorized recreation.

Caving/Cave Dependant Recreation Use
The effects on caving/cave dependent recreation would be the same as Alternative 5.

OMD Use
Alternative 7 authorizes the OMD to use the second largest and greatest range of lands of all the alternatives. These would include the Bend-Redmond block, a portion of the Mayfield area, Steamboat Rock area, and a portion of Millican Plateau. Unlike Alternative 6, the greater accommodation for motorized use in North Millican and Cline Buttes may tend to place a decreased emphasis on motorized use in the Bend-Redmond block. This may result in fewer conflicts with OMD training, although as noted previously, the level of active training done throughout this area is relatively low.

Alternative 7 provides additional training areas (i.e., Steamboat Rock and Millican) for the OMD. While potential conflicts with recreation use in these areas may occur in these areas, given the infrequent, rotational schedule of use for these areas, most conflicts could be avoided. The opportunity for the BLM to partner with the OMD in these areas may have long-term benefits to recreational use of these areas that outweigh any short-term effects of specific OMD training exercises.

Wildlife and Wildlife Habitat Management
The effects of wildlife management strategies for Alternative 7 are similar to Alternative 6. However, Alternative 7 does provide a slightly greater degree of flexibility by relying on low trail density and creation of unfragmented blocks to meet wildlife goals in the North Millican area instead of seasonal closures. Alternative 7 emphasizes historic distribution of wildlife habitat and restoration of habitat, but does place more emphasis on consideration of multiple resource goals (including recreation needs) in planning and implementing habitat restoration.

Cumulative Effects
The combination of a drastic reduction in roads open to the public (in favor of motorized trails) in North Millican and the paving of West Butte/Millican Road would likely result in increased conflicts between motorized trail use and other public land visitors. The increase in access provided by a paved surface road and the lack of roads providing full-size vehicle access into the area may result in full size vehicles using the trail system or the development of user created roads in the area.

Conclusions
Alternative 7 provides a diverse set of recreation opportunities, providing a range of exclusive non-motorized use areas scattered throughout the planning area. Other areas such as the Skeleton Fire area and Mayfield area are managed for non-motorized trail use, while allowing motorized use on roads in these areas. Large blocks of land (Bend-Redmond, Millican) are managed for shared use (motorized trail systems). The management strategy for Cline Buttes would require a high commitment of planning, engineering, education and enforcement resources by the BLM, more so than all other alternatives.

Land Ownership

Summary

Under all alternatives a core of about 191,000 acres would be zoned Z-1 (retention) to meet BLM multiple use objectives. Land tenure under this designation could not be changed without a Resource Management Plan Amendment except under the Recreation and Public Purposes Act and similar acts. The classification Z-1 almost ensures that lands so classified will remain under BLM management. However, this designation does not allow for use of such lands to be exchanged for private lands that would be even more highly valued. As consequence this classification reduces the flexibility of the BLM in meeting its management objectives. There are so few lands zoned Z-2, Z-3, and for community expansion common (CE) to all alternatives that analysis of those lands is not meaningful.

Land Acquisition and Exchange

There is a significant shift of land classification away from Z-2 and Z-3 and toward Z-1 in Alternatives 2-7. Lands that are desirable for acquisition are targeted to facilitate future opportunities for funding and partnerships. Although the purposes and priorities for land acquisition vary by alternative, the same base would provide for a future land acquisition program that could be used by numerous entities. Alternatives 2-7

all would have significantly reduced flexibility for acquiring lands through exchange when compared with Alternative 1, because of the shift away from Z-2 classifications. Alternative 7 provides the most Z-2 lands, at less than half the acreage of lands desirable for acquisition. Lands identified for acquisition (see Appendix D: Withdrawal, Disposal, and Acquisition Lands) are common to Alternatives 2-7. However, acquisition of many of these parcels is limited by the pool of BLM lands available for sale or exchange making acquisition of many of these parcels unlikely.

Community Expansion
Alternatives 2-7 all classify some portion of public lands as available for community expansion. Each alternative includes different configurations and stipulations associated with the designation. Alternative 4 has the greatest amount of land classified for Community Expansion, while Alternative 3 has the least. None of the alternatives classify more than 2% of the planning area for Community Expansion. Each alternative meets community and public land management objectives at different levels, depending upon whether stipulations on the lands include requirements for maintaining green space, as in Alternative 3, or interconnected open spaces, as in Alternative 5. Alternative 7, while it does not have the greatest amount, has few stipulations and will meet expected community needs for the next 10 – 20 years. For additional detail on community needs, see also Chapter 4 – Social and Economic Consequences.

Assumptions

BLM policy generally directs that public lands be retained in federal ownership, unless disposal or acquisition of a particular parcel would better serve the national interest and the needs of State and local people, including needs for lands for the economy, community expansion, recreation areas, food, fiber, minerals, and fish and wildlife. Changes in public land ownership would be considered where consistent with public land management policy and where improved management efficiency would result.

The Taylor Grazing Act provides the framework for categorizing public lands for retention, retention with an option to exchange for lands of equal or greater value, disposal, or acquisition based on resource values, administrative considerations, and social or economic community values.

Land classifications have the potential to affect future conditions. A Z-1 designation prevents transfer of public lands through sale or exchange except in rare incidences including a future land use plan amendment or congressional action. As such, this designation is the highest assurance that these lands would remain in public ownership. A Z-1 designation does not preclude use, lease, or transfer of public lands under the Recreation and Public Purposes Act (R&PP) and similar acts; however, often uses proposed under R&PP coincide with the values for the Z-1 designation. This designation also often limits transfer of lands to other public agencies better suited to manage specific parcels.

A Z-2 classification would only allow for exchange of public lands for private lands of equal or greater resource values. Managers often have the greatest flexibility to reconfigure undesirable ownership patterns (e.g.: intermixed private and public lands) by exchanging to acquire desirable parcels. In so doing, specific funding for acquisition is not required, rather desirable private parcels are obtained through an exchange of public parcels of roughly equal value. Attaching a “local area” restriction to the Z-2 designation assures that specific geographic areas retain a net balance of public land, but reduces both the land base from which to pull together an exchange package and the likelihood that an exchange will be successful.

A Z-3 classification is applied to lands that are no longer suitable to retain in public ownership. These lands include isolated parcels, fringe parcels, parcels that no longer

have resource values to retain, and parcels that no longer serve the purposes for which they were obtained. These lands can be sold directly or exchanged for more desirable private parcels. Often, however, Z-3 lands include encumbrances that preclude sale or exchange; for instance, several parcels identified as Z-3 lands include cinder pits, electrical substations, or transmission lines. It is unlikely that anyone other than the current users would be able to purchase or use these lands, given the legal status of the permits or rights-of-way.

Community Expansion is a designation where BLM recognizes the needs of communities to acquire public lands to meet growth needs. Community Expansion provides assurance to local governments that the land would not be traded to private interests and reduces the potential for communities to lose lands they have identified as critical for future economic growth and development, such as to meet state requirements for urban growth reserves. It may reduce the ability of BLM to maximize the trading value of its land if these lands would have otherwise been designated to the general pool of Z-2 or Z-3 lands because lands destined for community growth are generally in higher demand than lands with limited access or low economic value.

The Z-3 and Community Expansion lands provide a land trade base for targeted acquisition lands such as those along the river corridors, or undeveloped private parcels within larger blocks of public lands such as are in Cline Buttes, Badlands, or the Mayfield area. Many of these areas are likely to be developed in the course of the next 10-15 years if kept in private ownership. If these private parcels are not acquired and are developed, it is likely that additional rights-of-way will be granted and management costs associated with private use and development will increase.

Table 4-24 displays a summary of Land Tenure classifications by alternative

Analysis of the Alternatives

Alternative 1
Alternative 1 represents continuation of existing BLM management direction on lands within the planning area. The current classifications are displayed in Table 4 - 24 and

Table 4-24: Public Land Classifications

ALT	Z-1, Retain		Z-2, Retain but may exchange		Total for retention, Z-1 plus Z-2		Z-3, Dispose		Community Expansion		Total for disposal, Z-3 plus Comm. Ex.	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
1	206,201	51	175,523	44	381,724	95	15,422	4	5,617	1	21,039	5
2	359,690	89	23,082	6	382,772	95	12,639	3	7,592	2	20,231	5
3	357,598	89	34,829	8	392,427	97	7,456	2	3,120	1	10,576	3
4	327,335	81	57,488	14	384,823	95	9,669	3	8,512	2	18,181	5
5	322,693	80	66,713	17	384,406	97	7,821	2	5,776	1	13,597	3
6	344,406	86	39,693	10	384,099	96	13,789	3	5,115	1	18,904	4

described below. A more detailed discussion of effects of land ownership classifications on amenity values and community needs is included in Chapter 4 – Social and Economic Consequences.

Z-1, Retain
About 51 percent of BLM lands, about 206,200 acres, in the planning area would be retained. These lands would remain under BLM management and managed to meet multiple use objectives. Land tenure changes could occur without a resource management plan amendment only under provisions of the Recreation and Public Purposes Act and similar acts.

Z-2, Retain With Option to Exchange for Parcels of Equal or Greater Resource Values
About 175,500 acres or 44 percent, of BLM managed lands in the planning area, would be retained. This pool of lands would provide opportunities to make exchanges so land tenure adjustments could be made to meet the objectives described in the Brothers/La Pine RMP. Since more lands are available for exchange it is more likely for exchanges to occur under this alternative than any other. As a result it is more likely that an exchange could occur involving acquisition of lands in the La Pine area to block up BLM managed lands to provide habitat for deer migration. Similarly exchanges could occur that would acquire lands that would block up and or connect lands in the Northwest, Steamboat Rock, and Cline Buttes. Other large blocks within Z-2 could be blocked up with new acquisitions. Many of these Z-2 parcels have encumbrances and other uses. As a result many parcels would be less desirable and more difficult to exchange than parcels without encumbrances or established uses.

Z-3, Sale
About 15,422 acres or 4 percent of the planning area would be designated for transfer or disposal. All public lands designated Z-3 in this alternative qualifies under the BACA Bill. As a consequence all funds generated from the disposal of Z-3 lands from within the planning area may be returned to the district for the acquisition of lands that would meet BLM objectives.

A few parcels remain west of Highway 97 in La Pine. Various groups and agencies have expressed interest in obtaining them. These parcels are isolated and away from large blocks in public ownership. All these parcels have the potential to be of some value. Though encumbered, the location of the encumbrances on the parcels should not interfere with the future uses of these parcels. There is a high likelihood these parcels will be offered for Sale or Exchange.

Community Expansion
About 5,617 acres or 1 percent of the BLM managed land within the planning area would be designated for transfer or disposal to local government to accommodate community expansion and other public purposes. The designation of Community Expansion lands in Alternative 1 coincided with the needs of Redmond, Prineville, and La Pine at the time.

In La Pine the majority of the acres identified as Community Expansion have been conveyed to the community. No additional lands have been selected in this alternative. The community has provided information about future needs in this and other planning processes. This alternative does not have sufficient lands as Community Expansion to remedy the needs expressed by the community.

Opportunities for Prineville to obtain Barnes Butte (the public parcel northeast of the city) have only recently become available. During the term of this plan, it is likely that the community would request Barnes Butte to provide land for a park.

Historically, the lands south of Redmond have been of interest to the community, though not to the extant equal to the area described. Redmond requested only a portion of

these public lands for the purpose of moving the golf course from its present location. Redmond is likely to identify more lands for public purposes in connection with updating its Urban Growth Boundary.

Acquisition
No parcels were identified for acquisition in the Brothers – La Pine Resource Management Plan. Identification of acquisition lands would be in response to privately initiated exchanges or as the result of subsequent identification of lands suitable for acquisition.

Cumulative Impacts
The combination of Z-1 and Z-2 lands provides a base of BLM land for which the attainment of multiple use objectives is the primary goal. Under Alternative 1, the total acres so identified equals 97 percent of the acres similarly zoned in Alternative 7 the alternative with the most Z-1 and Z-2 lands. This alternative has, by far, the most Z-2 lands and though this means some land may be exchanged for lands currently possessed by different owners such acquisition parcels must meet BLM objectives and the net change in the amount of land managed by the BLM would likely be very small.

The mix of Z-2 and Z-3 lands makes the acquisition of new lands more likely than under any other alternative because the pool of lands available for sale or exchange is much larger than any other alternative. A significant loss of BLM-administered lands compared to other alternatives as a result of sales or exchanges is unlikely since the differences in the proportion of lands available for sale or for other outright disposal is five percent or less than the total BLM managed lands under all alternatives. This proportion is further reduced by the fact that some parcels classified Z-3 would not be considered desirable for acquisition by private parties due to poor land, the inaccessibility of the land, and the fact that the logical candidates for acquiring isolated lands, the adjacent landowners, have no need to purchase the land when they control access to the land.

Alternatives 2-6

Land Acquisition and Exchange
About 260,900 acres or 65 percent of the BLM managed lands in the Planning Area are designated Z-1. These lands constitute a core block of lands available to meet BLM objectives. Land tenure under this designation could not be changed without a Resource Management Plan Amendment except under the Recreation and Public Purposes Act and similar acts. The classification Z-1 almost guarantees that lands so classified will remain under BLM management. However, this designation does not allow for use of such lands to exchange for private lands that would be even more highly valued. As consequence this classification reduces the flexibility of the BLM in meeting its management objectives. Because this core of lands does not reflect any alternative, there are no consequences to be described.

The ranges of lands classified Z-2 and Z-3 are relatively narrow and provide from 16 to 38 percent of the number of acres of land available for sale or exchange under alternative 1. Because of the limited pool of lands available and the limitations of some available parcels of lands suitable for exchange it is likely that the acquisition of private lands to achieve BLM land tenure adjustment objectives, other than for community expansion would occur infrequently during the life of the plan under any of Alternatives 2-6. As a consequence, the objectives described for each of the alternatives concerning land tenure adjustments for other than community expansion are not likely to be met.

Alternative 2

Community Expansion
About 7,600 acres or 2 percent of the BLM managed lands would be designated for transfer or disposal to local government to accommodate community expansion and other public purposes.

In La Pine parcels were selected by representatives of the community and by planners from Deschutes County to match projects anticipated within the next few years. It is likely that these parcels will be transferred, though not all would occur within the life of the plan.

The area set aside for community expansion in the Redmond Area is the same as in Alternative 1. This area meets (and probably exceeds) the needs described by the community. As with Alternative 1, it is reasonable to assume some of the parcels will transfer, in support of highway 97, the fairgrounds, and the airport. The outcome will be the same as in Alternative 1.

Barnes Buttes in Prineville is Z-2, but the transfer of this parcel to local government is as likely for Alternative 2 as it is for Alternative 1.

Alternative 3

Community Expansion
About 3,120 acres or 1 percent of BLM managed lands within the Planning Area would be designated for transfer or disposal to local government to accommodate community expansion and other public purposes. Restricting the transfer to providing for parks, greenbelts, and open spaces would make such transfers less desirable for local communities. A similar restriction is in Alternative 6 and only along the Highway 97 corridor south of Redmond in Alternative 7.

This alternative is less likely to meet community needs because they would not provide for expected uses such as industrial land expansion. Other conditions that could affect the willingness or ability of other government agencies to acquire these lands may include:
- Lands identified as Z-3 are not quite where the communities identified;
- These lands are heavily encumbered representing diverse users;
- These lands have overlapping jurisdictional issues
- The communities of Bend and Redmond do not have jurisdiction;
- These lands have considerable non-resource uses associated with developing communities;
- Agencies with the greatest potential interests have reduced budgets; and
- Agencies with the potential interests have greater priorities elsewhere.

Along Highway 97 south of Redmond and in La Pine, these parcels are not likely to be requested by the county or communities. The park restrictions do not meet community needs. These parcels would not be transferred in this alternative.

Barnes Buttes is the same in alternatives 1, 3, 5, 6, and 7. Future use proposed by the community is consistent with the restriction.

Alternative 4

Community Expansion
About 8,512 acres or 2 percent of BLM managed lands in the Planning Area would be designated for transfer or disposal to local government to accommodate community expansion and other public purposes. Requiring development of transferred parcels to

include interconnecting open spaces would reduce the likelihood of implementing such transfers because the stipulations would make some developments difficult or preclude others such as industrial land expansion.

The lands offered in the La Pine area for Community Expansion would be consistent with future needs, as expressed by the community. Because these interests involve larger tracks for open uses, the special restrictions in this alternative may be incorporated into the projects. These parcels would be requested for transfer.

South and east of Redmond includes a large area open to community expansion, for the purpose of compatibility with the special restriction. However, the needs of the community may be difficult to blend with the restriction. Results would be the similar to those anticipated in alternatives 1 and 2 but more complex because of the restriction.

Alternative 5

Community Expansion
About 5,800 acres or 1 percent of BLM managed lands within the Planning Area would be designated for transfer or disposal to local government to accommodate community expansion and other public purposes. As in Alternative 4, development of transferred parcels would include providing interconnecting open spaces. This would reduce the likelihood of implementing such transfers for the same reasons described for Alternative 4. No lands are made available in La Pine, so this alternative is not likely to meet expressed community needs.

Providing less land than Alternative 4 in Redmond, south of the fairgrounds and along Highway 97 would further reduce ability of the community to meet its expansion needs. With additional Z-2 lands in this alternative, the possibility of an exchange could possibly provide needed lands. This proposed land pattern, however, conflicts with the objective of Redmond and Bend to keep the communities separated.

West of Redmond in Cline Buttes community expansion would not be impaired because the emphasis for transfer would be for park or open space purposes if an agreement was to be developed.

Lands designated for community development East of Redmond would be in or adjacent to the proposed Urban Growth Boundary. It is likely that these lands could serve the community in the future, blending open space with other community needs.

Barnes Buttes is the same in alternatives 1, 3, 5, 6, and 7. Future use proposed by the community is consistent with the restriction.

Alternative 6

Community Expansion
About 5,115 acres or 1 percent of the BLM managed lands within the planning area would be designated for transfer or disposal to local government to accommodate community expansion and other public purposes. By requiring transfers to be utilized for parks, greenbelts, open spaces, open recreation spaces, and open community infrastructure needs only this alternative reduces the probability that such a transfer will occur as described under Alternative 3. A similar restriction is in alternative 3 and only along the Highway 97 corridor south of Redmond in alternative 7.

In La Pine, these parcels are likely to be requested by the county or community. This use matches well with La Pine developments near the Little Deschutes River. The park restrictions do meet community needs. These parcels would be transferred in this alternative. Because of the restrictions this alternative would not provide sufficient lands

to meet expressed community expansion needs. However, there are considerable Z-2 lands available to the community and the county owns lands in the area that the BLM has identified as suitable for acquisition.

Parcels East and South of Redmond are not likely to be requested by the county or community. The park restrictions do not meet community needs. These parcels would be unlikely to be transferred in this alternative. Cline Buttes is the same as Alternative 5, with a reasonable likelihood of future use as open space.

Barnes Buttes would be the same as Alternatives 1, 3, 5, 6, and 7. Future use proposed by the community is consistent with the restriction.

Alternative 7

Land Acquisition and Exchange
Alternative 7 has fewer Z-1 lands and more Z-2 and Z-3 lands (in combination) than Alternative 2-6. This creates a larger pool of lands available for sale and exchange than these alternatives and consequently makes it more likely that exchanges, sales, and acquisitions could be made to achieve plan objectives than any of Alternatives 2-6.

The lands selected as Z-2 may provide exchange options that would improve the configuration of the public land pattern. Administration should simplify and improve through exchanges for private parcels with connectivity among large parcels and to block up (fill in) larger blocks. Acquired private lands should have equal or greater resource values than the public lands exchanged into private ownership.

There is no stipulation in this alternative that requires public parcels to be exchanged for private parcels in the same vicinity. Though no locality restriction is placed on parcels selected for exchange, many of these parcels are located close to areas where private parcels for acquisition have been identified. The emphasis for exchanges will be to reconfigure the land pattern in these identified areas; consequently, the emphasis for exchange of the surrounding Z-2 parcels would be local.

The greatest opportunity for success in the exchange process in is the La Pine area because many of the desirable private parcels are isolated and distant from communities and services, and the number of owners of desirable private parcels is low. The land designated for exchange in La Pine is for the purpose of changing the current north-south land pattern to an east-west pattern that coincides with the deer-elk migration route. Actively pursuing exchanges during the duration of the Upper Deschutes EIS/RMP is necessary because the influx of population projected over the next decade may severely restrict possible future exchanges as to make them not viable. Increasing development would widen the value discrepancy between public and private parcels.

In the northern portion of the planning area, the most viable exchange opportunities are for the private lands between the BLM-administered parcels and the Maury Mountains, USDA Forest Service. The gap between the two federal land patterns is narrow, the number of private landowners is few, and potential exchanges could improve management of both the private and public lands; hence, exchanges that would benefit both the public and private sectors.

Widening the land bridges between the large public land blocks encircling Alfalfa is still possible, but opportunities are quickly dwindling as the large ranches are converting into subdivisions, resorts, and ranchettes. Subdivided lands, complex ownership agreements and covenants, and existing encumbrances compound and escalate the difficulties in negotiating exchanges. It is doubtful that exchanges to provide for connectivity will

extend beyond the duration of the Upper Deschutes EIS/RMP. Developing private parcels and subdividing for the purpose of obtaining the greatest value per parcel will take BLM out of the market.

The possibilities for exchanges to the northwest and southwest of Cline Buttes are less likely than around Alfalfa. Cline Buttes already has a greater development potential than Alfalfa and is further along. Recent exchange opportunities for the purpose of providing corridors have been opposed by local property owners, local watchdog groups, and other agencies. It is doubtful that any of the goals for pursuing exchanges will be obtained, and the current public land pattern will remain the same.

The isolated and semi-isolated public parcels selected for exchange would be to meet resource goals, primarily in adjacent large public blocks throughout the planning area, but could also be used outside the planning area if determined for the general public good. Many of these parcels are in the middle of subdivisions, growth areas, and other non-compatible resource uses. Many of these parcels were Z-2 or Z-3 in the Brothers La Pine RMP. It is doubtful that more than a quarter of these parcels would be exchanged, judging from exchanges and incomplete proposals over the last decade.

Although acres designated Z-2 exceed those similarly designated in Alternatives 2-6,the acres designated as Z-2 are disproportionately small (less than half as many as Alternative 1) compared to the acres selected for acquisition in this plan. Though well located to match the areas selected for acquisition, the amount of public lands made available for exchange is too small for a substantial exchange program and compared to Alternative 1, acquisition of parcels that would meet plan objectives would be much less likely or frequent

Community Expansion
About 4,882 acres or 1 percent of BLM managed lands would be designated for transfer or disposal to local government to accommodate community expansion and other public purposes.

The public lands selected for Community Expansion was confined to the least amount of area that would still allow for viable community/social needs. Representatives from the communities were instrumental in the selection of parcels. Their participation ensured consistency with community development plans for the city of Redmond, the community of La Pine, Deschutes County, and Crook County. It is reasonable to assume that these parcels will be requested for public purposes before the end of the life of this plan.

The selection of public lands for Community Expansion also recognizes previous requests from communities and considers what agency or cooperation of agencies would best represent community values. Transferring or cooperatively developing Barnes Buttes as a local park is an example of such considerations that may occur. Barnes Buttes is the same in Alternatives 1, 3, 5, 6, and 7. Future use proposed by the community is consistent with the restriction.

The parcels in La Pine would meet the expressed needs of the community and are likely to be requested by La Pine.

A restriction is added along the Highway 97 corridor south of Redmond: Designation applies only to parks, greenbelts, open spaces, open recreation spaces, and open community infrastructure needs. The same restriction is in Alternative 6 and a similar restriction is in Alternative 3.

Restricting the selected public parcels in T. 16 S., R. 12 E. and R. 13 E. to parks and open space would inhibit opportunities for commercial, industrial and residential development along the 97 corridor. Restricting use was intended as a consequence of

Alternative 7; however, it also strictly limits who would be available to acquire these parcels. Qualifying agencies would be those public agencies most hampered by budget restrictions or reductions. This limits the possibility that these parcels will be transferred; however, the designation provides options in the case that a bypass for Highway 97 is developed.

The lands to the east of Redmond would be located outside the Urban Growth Boundary but are consistent with future growth direction, and go into the boundary as it develops. The city is open to cooperative management of these lands. Some uses are likely to occur during the life of the Upper Deschutes RMP.

The land south of the Redmond Airport and the Deschutes County Fairgrounds are in the Urban Reserve Study and would likely be requested for public uses.

Cumulative Impacts

The primary potential for cumulative effects is on land acquisitions. The small pool of lands that would be available for sale or exchange to help acquire private lands is compounded by private demand for some of the same parcels. It is very likely that many if not most of some key parcels would be developed before an exchange or outright purchase could be completed. A prime example of this is the proposed development of a destination resort on the southeast flanks of Powell Butte. This area has been identified as an important area to acquire to link public lands to the east and west of this area for wildlife travel corridors. The small pool of BLM managed lands and the diminishing pool of undeveloped private lands makes the probability of making land tenure adjustments that would meet plan objectives quite low. As with all alternatives, the ability to make land tenure adjustments is dependent not only on the pool of BLM-administered lands available for sale or exchange but also on the availability of undeveloped private lands. The very growth in the region that has spurred this plan revision makes land tenure adjustments needed to meet plan objectives more difficult because of private sector competition for the same parcels.

Overall, in an area with dynamic growth, the exchange process cannot keep pace with the private sector. Simply, it takes too long for a governmental exchange and it is more profitable for private landowners to stay in the private market. It also increases the potential value to not work with BLM, but to use the public parcels as an enticement for private sector land transactions. This further reduces the likelihood of exchanges of public parcels.

Effects of Addressing other Issues on Land Tenure Adjustments
In Common to All Alternatives, Z-2 lands with special status species would not eligible for exchange. Exchange or sale of lands with rights of way, mineral development or claims, or other encumbrances would be less likely to be exchanged or acquired than other parcels.

Transportation and Utilities

Summary

Each alternative represents a different configuration of lands that are either available for right-of-way project development, excluded from development or available with restrictions. The differences of each alternative reflect a change in magnitude of effect.

Public lands will continue to be available for rights-of-way, including potential sites for wind energy, solar energy, and communication facilities where consistent with national, state and local plans. Alternative energy site testing and monitoring activities would be

considered in areas outside of wilderness study areas (exclusion areas). Areas such as Areas of Critical Environmental Concern (ACECs), visual resource management areas, critical habitat areas, and other special management areas are considered avoidance areas, and would have restrictions to mitigate impacts. Wildlife habitat effectiveness values (primary, secondary, and minor emphases) and recreation management emphases would designate areas for non-motorized emphasis and non-motorized exclusive use. These management designations vary by alternative and will affect the number and location of roads in geographic areas.

During the period the B/LP RMP has been in effect, an average of about twenty-five new rights-of-way per year were granted in the planning area. Currently, there are approximately 742 local utility and transportation right-of-way grants in the planning area, which extend 780 miles through public land. These include right-of-way corridors and communication sites that may contain more than one project. Most rights-of-way were granted to provide access or utility service through public lands and include roads/driveways and electric/telephone service. To date, there has been no interest expressed by industry for solar or wind energy development in the planning area.

In December 2002, ODOT completed the Yew Avenue to Deschutes Market Road Analysis for Highway 97 from MP 121.89 to MP 130.18. The preferred alternative includes an extension of 19th Street south to a proposed interchange at the Hwy. 97/Quarry Street intersection and then approximately another four miles to the south to the existing US 97/Deschutes-Market interchange.

Assumptions

General assumptions

As the population of Central Oregon grows, the need to extend transportation and utility corridors through public land continues. With additional technological improvements, certain areas may be considered for alternative energy development such as wind, solar and biomass generation. While the current contribution of renewable energy resources is relatively small, wind energy and other renewable energy generating sectors of the economy are growing in the United States. Continued growth in wind energy development is considered important in delivering larger supplies of clean, domestic power that is needed for economic growth.

For the most part, existing transportation and utility corridors are situated in areas that will continue to be available in the future for right-of-way project development. There are currently 780 miles of local rights-of-way and utility corridors and 202 miles of regional corridors affecting public land in the planning area. It is likely that many future right-of-way development projects would be co-located along existing corridors. Locating an additional utility line adjacent to an existing right-of-way would allow for the use of the existing access roads and would consolidate impacts. Consolidation produces less contact between competing land uses and conserves resources by confining impacts to specific areas where they can be mitigated and managed.

Federal land management agencies are active participants in the identification of utility corridors. These agencies must comply with laws, policies and regulations that were established to protect resources and create special management areas, which limit the overall area available for corridors. Most utility corridors are designed to extend along existing transportation routes or are parallel to existing right-of-way projects. By consolidating compatible transportation and utility projects, the agency can reduce habitat loss, degradation of resources and fragmentation of public land ownership patterns.

Due to the low potential for wind energy development in the planning area, Visual Resource Management Class II restrictions as well as wildlife and recreation concerns are not expected to have a notable adverse affect on the wind energy industry.

The Concentrating Solar Resource (CSR) in the planning area is higher than the national average. There are many areas available for solar resource development that fall outside of exclusion/avoidance areas. Generally, these locations are equally viable due to the relatively constant CSR. Due to the absence of interest in development of solar resources within the planning area and the large areas that would be available for such development, the designation of exclusion/avoidance areas and other restrictions is not expected to have a notable adverse effect on the solar energy industry.

Corridor widths for transportation and utility facilities would vary depending on the number of parallel systems. A minimum of 1,000 feet on each side of the existing centerline would consolidate multiple regional systems effectively. A system of planned corridors provides programmatic environmental review and facilitates the analysis of project routing alternatives.

The various corridors and avoidance/exclusion area allocations will guide, restrict or preclude energy facilities. Given the uncertainty over specific locations, project design and mitigation measures, project level NEPA will be required to assess impacts. Temporary small-scale facilities, such as wind feasibility monitoring studies will require individual assessments.

Regional transportation assumptions
ODOT predicts that it will be necessary to upgrade the standard of Hwy 126 by adding lanes and reducing the radius of curves. The Redmond Airport Master Plan describes the extension of Runway 22 for a distance of 1,500 feet. This would extend the runway protection zone north and east. The Federal Aviation Administration has mandated the establishment and protection of runway protection zones and would not allow the highway standard to be improved in the existing alignment within the runway protection zone.

Traffic congestion and the anticipated failure of the Yew avenue interchange on Hwy 97 in south Redmond is a result of the high growth rate and increasing traffic volumes caused primarily by activities associated with the Deschutes County Fairgrounds and adjacent commercial and industrial development. The residential development in Redmond is focused in areas that are west of Hwy 97. This contributes to the number of vehicles utilizing the interchange to access commercial, industrial and airport areas located along Hwy 97 and east of this travel corridor. The Bend-Redmond highway corridor contributes significantly to daily traffic numbers at the Yew Avenue interchange. Ultimately, Hwy 97 will require a frontage road to provide access to parcels that are directly adjacent to the expressway.

The Oregon Department of Transportation has been involved in several studies and highway improvement projects in this area in recent years. The project known as the Glacier-Highland Avenue couplet has recently been approved by ODOT and involves the redesign of the intersection of Hwy 126 and Hwy 97. This includes the improvement of Highland Avenue and Glacier Avenue as one way routes for Hwy 126 west of Redmond.

The Redmond Re-route Project is currently being designed by ODOT. It involves the northern segment of Hwy 97 extending east of downtown Redmond along Canal Blvd., from Sisters Avenue to Kingsway Road.

Local transportation assumptions
In Alternatives 2-7, wildlife habitat areas will be managed in terms of primary, secondary, and minor emphases. In general, those areas with "primary" wildlife emphasis are

likely to have fewer local roads that remain open compared to areas with minor wildlife emphasis. Non-motorized categories of recreational use include designations labeled "non-motorized emphasis" and "non-motorized exclusive." Areas designated as non-motorized emphasis allow motorized use on roads, but not on trails. Non-motorized exclusive areas are closed to all motorized uses. In some cases, areas that have a non-motorized recreation emphasis and a primary wildlife emphasis may see greater reductions of local roads.

The level of management for wildlife and recreation in the geographic areas will influence the allowable road densities for local transportation planning. The level of management will correspond to the prescribed management levels for wildlife (habitat effectiveness) and recreation (non-motorized emphasis and non-motorized exclusive).

The Department of the Interior has imposed a moratorium on the adjudication and formal recognition of roads that are claimed to have been established under the provisions of RS 2477. The county historical roads have not been reviewed and adjudicated by BLM and until such time as these roads are properly adjudicated, BLM will not take any action to challenge their status. Adjudication of historical roads involves a process that is independent of this plan.

Right-of-way corridor assumptions

In Alternatives 2-7, the classification of areas for avoidance, exclusion and areas open for right-or-way project development would serve to minimize conflicts between the needs for land development and the protection of important ecological areas. The number and acres of Areas of Critical Environmental Concern varies by alternative. Table 2-1 represents the acres of ACEC that are designated by alternative. The acreage available for right-of-way development also varies by alternative.

Management direction for rights-of-way in recreation and wildlife emphasis areas will influence the allowable road densities for local transportation planning and right-of-way administration. The level of management for transportation and utility systems will correspond to the prescribed management levels for wildlife (habitat effectiveness) and recreation (non-motorized emphasis and non-motorized exclusive).

The effects of wildlife and recreation emphasis areas on right-of-way projects may include additional project stipulations that require access restrictions, locked gates, and appropriate mitigation. These tasks would require additional analysis in the environmental documents as well as additional compliance efforts in right-of-way administration.

New or modified rights-of-way corridors would be provided for transportation and utility corridors, and for communication or energy sites. New alignments may be considered outside of existing corridors when no existing right-of-way designations are available. Project level NEPA will be required to assess the impacts of large-scale developments, and temporary small-scale facilities, such as wind feasibility monitoring studies will require individual assessments. Western Regional Corridor Study corridors would be designated.

Public lands in the planning area would continue to be available for site testing and monitoring of potential alternative energy projects to determine development feasibility.

The effects of right-of-way development may include surface disturbing activities, erosion, dust, noise, and the need for access projects. Right-of-way allocations may also create conflicts with residents of adjacent lands or onsite conflicts with resources or existing public land uses. Management conflicts such as illegal dumping, shooting near residential areas, vandalism, wood cutting, and surface disturbing activities (which may lead to the spread of noxious weeds), may follow right-of-way project development due

to additional access points to public lands. Wind turbines and powerlines could result in avian mortality including eagles and other raptors, although research efforts in recent years have mitigated these adverse impacts (Sinclair, 1999).

By issuing site and lineal rights-of-way outside of existing corridors, public land ownership patterns could become further fragmented by these new structures and access roads.

Exclusion and avoidance areas would consolidate right-of-way projects in existing corridors that are located in areas designated as available for project development. The consolidation of compatible transportation and utility projects would reduce habitat loss, degradation of resources and the fragmentation of public land ownership patterns. Major transportation and utility corridors border the Badlands Wilderness Study area and would provide for right-of-way co-location around this exclusion area, if needed.

There are visual intrusions introduced on the landscape from the development of right-of-way projects. Road development and surface disturbing activities such as borrow areas and staging areas are effects of constructing major lineal or site right-of-way projects. Soil disturbance and vegetative manipulation are likely to result from construction activities. Utility poles, communication towers, wind turbines, photovoltaic cells, and other structures could have varying adverse effects on viewsheds depending on the location, size, and scale.

The cumulative effect of new right-of-way projects that are not co-located would be greater that the cumulative effects of such projects that are co-located along existing corridors. New right-of-way projects would add to the impacts existing right-of-way projects. The cumulative effects of existing and future projects located on BLM-administered public land are combined with projects located on private, state or other federal ownerships as well.

The designation of exclusion and avoidance areas would cumulatively add to present and future restrictions and mitigation requirements of right-of-way development on public lands. The plan carries forward the restrictions included in the B/LP RMP and adds to the standard terms and conditions required in 43 CFR 2801. Future decisions may add further requirements and/or special stipulations on project development.

Analysis of the Alternatives

Common to Alternatives 2-7

Management direction Common to Alternatives 2 – 7 would emphasize regional and local integrated transportation planning, provide transportation corridor allocations, and provide mechanisms to reduce the amount of redundant or unnecessary roadways. Exclusion and avoidance areas would serve to minimize conflicts between the needs for land development and the protection of important ecological areas. The differences in the transportation systems for each of these alternatives are highly dependent upon future decisions concerning the local road configuration. The two resources most likely to influence these configurations are recreation and wildlife.

The classification of areas for avoidance/exclusion and areas open for right-of-way project development is intended to minimize conflicts between varying needs for land development.

Direct Effects

Regional Transportation
Allocate a transportation corridor for the realignment of Hwy 126 east of Redmond to avoid the designated runway protection zone of Redmond airport.

Local Transportation
Designate all existing right-of-way routes as local corridors for future co-location of compatible projects.

Regional corridors identified by the Western Utility Group as "priority" would be allocated. Existing and proposed regional corridors extend through areas that are available for right-of-way project development and do not affect exclusion and avoidance areas. A system of planned local corridors provides opportunities for programmatic environmental review and facilitates the analysis of project routing alternatives.

Local jurisdictions could be asked to vacate unneeded historical roads as mitigation for granting a right-of-way in a new location. BLM will close and rehabilitate certain non-designated roads and trails that are excess to transportation needs. BLM will reduce the number of general access points to public land. BLM would designate the existing road systems to create loop routes that return to the same access point. Motorized access points not selected for designation, but required for other uses, could be limited to authorized access through such methods as posting, barricading, or installing gates. Examples may include access roads needed by grazing operators and utility companies or local roads needed for administrative access.

Right-of-Way Corridors
Areas are classified as avoidance, exclusion or availability for right-of-way project development. In the existing Brothers-La Pine RMP there are six ACECs that total 24,628 acres. In Alternatives 2-7, the number of ACECs range between eight and twelve, affecting between 23,593 to 60,566 acres.

Regional utility corridors that are designated in the Western Regional Corridor Study, as revised, would be recognized. Proposed routes identified by the Western Utility Group as "priority" would be allocated.

Indirect Effects

Regional Transportation
The effects of project development would result in providing a land allocation for the realignment of the highway when upgrading is determined to be necessary. When Highway 126 is improved, the Federal Aviation Administration will require that it be relocated outside of the runway protection zone. A corridor allocation one half mile wide would extended through public lands to provide a minimum distance and acreage necessary to comply with highway standards and the needs of Redmond Airport and State and local planning goals. The highway would be realigned to allow for increased traffic flows with a higher level of safety for motorists, and the highway right-of-way would be fenced to control access.

Effects of highway realignment would include clearing vegetation along a strip about 100 feet wide that would extend about one mile through public land. Site preparation would involve removal of surface rock and construction of the road base in compacted layers. Sight distances would be improved by removing dips and improving the grade of the road surface. The curve radius would be reduced and overall traffic safety would be enhanced.

Consolidation of regional projects conserves resources by confining impacts to specific areas where they can be mitigated and managed. Federal land management agencies are active participants in the identification of utility corridors. A system of planned corridors provides programmatic environmental review and facilitates the analysis of project routing alternatives. Most utility corridors extend along existing transportation routes or are parallel to existing right-of-way projects.

Local Transportation
Transportation planning would be coordinated with local, state and federal jurisdictions to avoid conflicts with multiple use management. Efficient transportation systems would be designed through cooperative interagency planning. The system would be comprised of designated access points from major collectors or arterials, with approved approaches to major roads from the respective jurisdiction. BLM roads would be identified with markers and designed with loops to provide reasonable access to public lands. Relinquishment of unneeded historical roads would allow BLM to close the road or manage it for purposes other than transportation. Road systems will be considered for closure if problems exist such as resource damage, public safety hazards, and repeated law enforcement violations.

Vacating segments of unneeded historical roads would eliminate surplus routes, and reduce habitat loss and the fragmentation of public land ownership patterns. Closing historical roads to motorized use would serve to protect the cultural value of the road and allow for interpretation and non-motorized access. Closing and rehabilitating certain non-designated roads and trails that are excess to transportation needs would consolidate the local transportation systems, reduce maintenance costs and improve the management capabilities. Reducing the number of access points to public land would consolidate the local transportation system, reduce maintenance costs and improve management capabilities. These reductions may deter illegal uses such as dumping and wood cutting. Existing road systems would be designated to create loop routes that rely on fewer access points. Dead-end roads would be closed and rehabilitated. This would reduce maintenance costs and result in a more efficient transportation system. Certain collector roads, local roads and user created roads may be closed and rehabilitated.

Administrative access may continue to be necessary in areas where routes are closed and access points are reduced. Examples may include utility access roads, grazing access roads, or local roads needed for BLM administrative access. These access points would have gates or cattle guards installed to allow access for authorized uses and to ensure visitor safety. Excess roads that are not designated routes would be closed and rehabilitated to reduce indiscriminate uses such as illegal dumping, wood cutting, and surface disturbing activities that spread noxious weeds and cause erosion.

Signs could be installed at designated access points to convey important information about designated roads and allowable uses in the area. The approach of the access point with a major arterial would be regulated by an approach permit that would be reviewed and approved by the respective jurisdiction. Approach permits would enhance public safety for ingress and egress to public lands from major roads.

Motorized access points not selected for designation, but required for other uses, would be open for authorized users such as grazing operators, utility companies or other administrative uses. This would ensure continued access for authorized uses.

If a new right-of-way is issued contingent upon relinquishment of a public road segment, the County Commissioners would initiate a public process that applies to the vacation of a public road. Rehabilitation could include ripping and seeding road surfaces and covering treated areas with woody vegetative material and rocks to blend with adjacent areas.

Areas would be managed with respect to habitat effectiveness and labeled in terms of primary, secondary, and minor emphasis. For example, a primary emphasis area will be managed for 70 percent habitat effectiveness, which corresponds to a lower road density or acreage configuration of public land ownership. The buffer distances around each site varies by species, and generally would range between ¼ and ½ mile.

Right-of-Way Corridors

The indirect effects of exclusion or avoidance areas could possibly result in higher construction costs due to the longer distances for right-of-way projects involved with going around these areas. Also, construction schedules may be delayed for projects that extend through special wildlife habitat areas that may require seasonal access restrictions. Specific effects would be determined on a case-by-case basis.

The indirect effects of wildlife and recreation emphasis areas on right-of-way projects may include additional project stipulations that require access restrictions, locked gates, and appropriate mitigation. This would require additional analysis in environmental documents as well as additional compliance efforts in right-of-way administration.

Specific mitigation activities for a project would serve to reduce long-term impacts to natural resources in areas adjacent to right-of-way development. Restoration of an area would be commensurate with the effects of a specific action. Mitigation requirements would be determined by the environmental assessment report during the processing of a right-of-way application and would correspond to the level of management emphasis and the objectives of the corresponding habitat effectiveness. Mitigation may involve the closing and rehabilitating of surplus roads, the construction/repair/relocation of fences, and efforts to restore native vegetation in the immediate vicinity of the project. The costs of mitigation would be incurred by the applicant.

Mitigation for utility structures may include bird boxes and/or nesting platforms to improve raptor safety. Impacts would be assessed in relation to wildlife emphasis areas and the corresponding management of habitat effectiveness as defined for primary, secondary and minor emphasis areas. The objective of mitigation would be to preserve blocks of public land and to enhance native plant communities and wildlife habitat areas.

If it is not feasible for a new right of way project to collocate along an existing corridor, it will likely create a new impact in an area that is previously undisturbed and would add to the 982 miles of right-of-way that exist in the planning area. Activities would generally be confined to the immediate area affected by the project. Mitigation would provide opportunities to enhance resource values by maintaining habitat diversity.

The effects of right-of-way development may include surface disturbing activities, erosion, dust, noise, the need for access and the spread of noxious weeds. Projects may create conflicts with residents of adjacent lands or onsite conflicts with resources or public land uses.

New right-of-way projects situated outside of existing corridors are subject to the management guidelines for the respective emphasis area. In some cases, these areas coincide. Constraints may be imposed on right-of-way projects to avoid road building and reduce road and trail densities in the immediate vicinity of the project. Right-of-way project development would be designed to avoid impacting large patches of public land that provide un-fragmented habitat areas.

Utility corridors serve to concentrate uses along existing routes and avoid the proliferation of lineal project development to minimize adverse environmental impacts.

By utilizing existing corridors, public land ownership patterns would not be fragmented when new projects are developed. Retaining public land ownership patterns in larger units contributes to efficient management. Utility structures and access routes could be shared by right-of-way holders and access to public lands could be effectively managed.

The co-location of right-of-way projects would consolidate impacts and avoid the proliferation of separate development. Single access routes could be used by multiple users. In addition, regional utility corridors that will allow industry to conceptualize plans for routing regional utility corridors through federal lands could be allocated.

Cumulative Effects

Regional Transportation
The realignment of highway improvements outside of the runway protection zone would benefit the Redmond Airport and improve safety for the general public using the highway. The new route would extend through public lands that are situated adjacent and east of the Redmond urban growth boundary. The improved highway would be established outside of the runway protection zone to connect with other highway improvement projects in the Redmond vicinity. The Federal Aviation Administration requires avoidance of the runway protection zone, by relocating a segment of the Hwy 126 corridor when it is improved, and the new route would be wider and improve motorist safety.

Holders of existing rights-of-way that would be affected by realignment of the highway would be consulted. The relocation of the highway is not expected to have adverse affects on existing rights.

Approved regional corridors will allow industry to plan for regional infrastructure needs and ensure the alignment of corridors with adjacent regions. Specific proposals for projects inside of designated regional corridors will require additional environmental review.

Local Transportation
These proposed actions require coordinated transportation planning with local, state and federal jurisdictions to avoid conflicts with multiple use management. Through cooperative interagency planning with the Oregon Department of Transportation, county road departments, and other agencies, BLM would develop an efficient local transportation system through public lands.

A subsequent transportation planning effort would identify certain collector roads, local roads and user created roads to be closed and rehabilitated. The designation of an efficient, practical road system through public lands may require constructing new road segments to enhance opportunities for administrative and recreational access. A system of roads would include designated access points from major collectors or arterials, with approved approaches from the respective jurisdictions. A designated system that is maintained for public use would enhance travel management and improve public safety.

The transportation system would include the development of grade-separated crossings for recreation trails at specific locations on public lands. Trail crossings would extend under roads to facilitate the connectivity of recreational trails through public lands.

Right-of-Way Corridors
Site-specific analysis of cumulative effects is not possible due to the uncertainty of the

time and location of future right-of-way proposals. However, the cumulative effects of land allocations open to right-of-way uses can be discussed in general terms of areas unavailable for right-of-way designation (avoidance or exclusion areas).

Existing projects include two major buried gas transmission pipelines, a buried gas distribution line, a major irrigation canal, an electric distribution line and a buried telephone cable.

The cumulative effects of off-site mitigations would add to present and future restrictions and mitigation requirements of right-of-way development on public lands. The plan carries forward the restrictions included in the Brothers-La Pine RMP and adds to the standard terms and conditions required in 43 CFR 2801. Future decisions may add further requirements and/or special stipulations on project development.

Alternative 2

In this alternative, an integrated local transportation system would be designed that uses existing road systems. Maintenance standards of BLM-managed roads would be kept to minimum levels and there would be minimal development of new rights-of-way on public lands. Routes may be indirect, alignments narrow and public safety may be at risk. These effects would increase over time as the population and traffic volumes increase.

There would be an allocation for a transportation/utility corridor from south Redmond to Deschutes Junction as a partial solution to resolve traffic problems at the Yew Avenue interchange.

Regional Transportation
The county arterial from south Redmond to the Deschutes Junction Interchange on Highway 97 would alleviate some traffic congestion at the Yew Avenue interchange. This corridor could be considered in the future as part of a highway bypass around Redmond. The transportation/utility corridor from south Redmond to Deschutes Junction would extend ¼ mile on each side of centerline along the Burlington Northern-Santa Fe (BNSF) railroad right-of-way. Mitigation would require Deschutes County to vacate segments of the historic roads known as Horner road and the Powell Butte-Paulina Creek road. These road segments extend about 17 miles through public land in T.16S, R.12-13E.

Local Transportation
Public lands contain numerous historic roads that were presumed to be authorized under the provisions of Revised Statute 2477 and remain under local jurisdiction. In this alternative an integrated transportation system would be designed that utilizes existing and historic road systems including county rights-of way. Maintenance standards of BLM administered roads would be kept at minimum levels to provide for reasonable public access. County standards determine road maintenance levels of county roads. Historic roads are not maintained or improved by county jurisdictions. Maintenance standards of BLM administered roads would be kept at minimum levels to provide for reasonable public access.

Direct Effects

Regional Transportation
Public lands are available for the allocation of a transportation/utility corridor from south Redmond to Deschutes Junction.

Local Transportation
The availability of existing roads to be used as the basis for a designated transportation system. The use of existing alignments would preclude the option of locating new roads along more direct and reasonable routes.

In some cases, areas that have a non-motorized recreation emphasis and a primary wildlife emphasis may see greater reductions in local roads.

Indirect Effects

Regional Transportation
A right-of-way corridor from south Redmond to Deschutes Junction would extend about four miles through public land, and equal about forty acres, if it is located adjacent and east of the railroad right-of-way. Anticipated impacts are related to constructing a major public road through an area that currently has limited public access. Adverse impacts to wildlife populations could be expected as well as site-specific impacts associated with locating, clearing and constructing a major public road. Impacts the old growth juniper woodland would include loss of vegetation and soil disturbance. The corridor would also add to the fragmentation of the public land ownership pattern.

If the alignment is placed west of the railroad right-of-way and east of Hwy 97, it would affect mostly private land and only extend through corners of fragmented public ownership. The jurisdiction of these fragmented corners could be transferred to ODOT through provisions of a right-of-way grant, which would reduce the administrative costs to the BLM for managing these isolated areas. An alignment on the west side of the railroad would consolidate the right-of-way between existing corridors.

The construction of a transportation corridor from south Redmond to Deschutes Junction would create a demand for construction materials such as rock aggregate. Specific rock would be needed, as well as borrow material for establishing a suitable grade. Locations on adjacent public lands may be identified as a source for mineral materials.

Local Transportation
Historic roads generally have a narrow alignment, meander around physical features, and have design limitations when compared to the needs of modern transportation systems. Many existing routes were originally located to serve areas that were historically significant, but may not provide efficient or direct access to accommodate the transportation needs of the present time. The use of existing historic roads as the primary component of a transportation system would be insufficient to connect destinations that are needed today. It could be necessary to reduce curves and grades, widen travel lanes, and eliminate physical limitations such as rock outcrops.

The efficiency and function of the transportation system through public lands would be compromised by using existing historic road alignments. The high costs associated with road improvements within existing alignments may not be effective in solving modern transportation problems. Routes may be indirect, alignments may narrow and public safety may be at risk. These negative effects would increase over time as the population and traffic volumes increase.

The following narrative describes the management levels that will influence the allowable road densities for local transportation planning:

- **Non-Motorized Recreation Emphasis Areas** - includes the block of public land southeast of Bend, and south of Highway 20, extending to the Deschutes National Forest boundary; the area around Tumalo reservoir; the area northeast of Sisters; and the area south of Alfalfa Market road extending to Dodds road.

- **Non-Motorized Recreation Exclusive Areas** - includes the area south of Bend Airport; areas along the Deschutes and Crooked Rivers; and public lands adjacent and southeast of Tumalo Reservoir.
- **Wildlife Primary Emphasis Management Areas** - includes the Badlands Wilderness Study Area and the area south of Highway 20 to the National Forest boundary; the area around Tumalo Reservoir; the area northeast of Sisters and areas along the Little Deschutes River, east of La Pine State Park.

Cumulative Effects

Regional Transportation
The cumulative effects of the BLM decision to allocate a transportation corridor from south Redmond to Deschutes Junction would facilitate efforts by regional transportation planners to resolve problems associated with traffic congestion in this area.

Alternative 3
This alternative provides for the allocation of a transportation corridor from south Redmond to with an interchange on Hwy 97. Mitigation would require Deschutes County to vacate 10 miles of historic road segments.

Direct Effects

Regional Transportation
This alternative provides for the allocation of a transportation corridor from 19th Street in south Redmond to Quarry Road with an interchange on Hwy 97. Mitigation would require Deschutes County to vacate a two mile segment of Morrill road and an eight mile segment of the old Powell Butte - Paulina Creek road, located in T.16-17 S., R.13 E.

Indirect Effects

Regional Transportation
The allocation of a transportation corridor from 19th Street in south Redmond to Quarry road with a proposed interchange on Hwy 97 would extend through public lands for about two miles and affect about 19.4 acres.

Anticipated impacts are related to constructing a major public road through an area that currently has limited public access. Adverse impacts to wildlife populations could be expected as well as site-specific impacts associated with locating, clearing and constructing a major public road. Impacts the old growth juniper woodland include loss of vegetation and soil disturbance. The fragmentation of the public land ownership pattern would be increased.

Road construction would create a need for mineral materials such as rock aggregate. Specification rock would be needed as well as borrow material for establishing a suitable grade. Sites on adjacent public lands may be identified as a source for mineral materials.

Local Transportation
The following narratives describe the management levels that will influence the allowable road densities for local transportation planning:
- Non-Motorized Recreation Emphasis Areas - includes the block of public land southeast of Bend and south of Highway 20, extending to the Deschutes National Forest boundary; the area northeast of Sisters; and the area southeast of Prineville Reservoir.
- Non-Motorized Recreation Exclusive Areas - include the Badlands Wilderness Study Area, the area south of Alfalfa Market Road to Dodds Road, Cline Buttes east to the Deschutes River; a large block along the Crooked River canyon between Prineville and Bowman Dam; and public lands surrounding Tumalo Reservoir.

- Wildlife Primary Emphasis Management Areas - includes the area around the Crooked River Canyon, Prineville Reservoir and south to Millican; the Badlands Wilderness Study Area and the area south of Highway 20 to the National Forest boundary; the area around Tumalo Reservoir, the area northeast of Sisters; Cline Buttes east to the Deschutes River; and the area south of Alfalfa Market Road to Dodds Road, most of the public lands in the La Pine basin, except those east of the La Pine core area.

Cumulative Effects

Regional Transportation
A transportation/utility corridor from south Redmond to Quarry Road would provide a beneficial effect as a component in solving traffic flow problems in the south Redmond area.

This allocation considers the transportation needs of a growing community. This alternative would accommodate the additional traffic associated with the projected growth in the region and the development of commercial and industrial lands in the south Redmond area. The cumulative effects of the BLM decision to allocate a transportation corridor from south Redmond to Deschutes Junction would facilitate efforts by regional transportation planners to resolve problems associated with traffic congestion in this area.

Alternative 4

Indirect Effects

Local Transportation
In some cases, areas that have a non-motorized recreation emphasis and a primary wildlife emphasis may see a greater reduction of local roads.

The following narrative describes the management levels that will influence the allowable road densities for local transportation planning:

- **Non-Motorized Recreation Emphasis Areas** – south of the Crooked River and the area southeast of Prineville Reservoir; the block of public land southeast of Bend and south of Highway 20, extending to the Deschutes National Forest boundary; south of Alfalfa Market Road to Dodds Road; the Tumalo Reservoir area; the area east of Cline Buttes to the Deschutes River.
- **Non-Motorized Recreation Exclusive Areas** - includes the corridor along the Deschutes and Crooked River canyon; the public lands on Powell Buttes; the small block of public land south of Bend Airport and east of the Powell Butte highway.
- **Wildlife Primary Emphasis Management Areas** - includes the area around the Crooked River Canyon, and the area southeast of Prineville Reservoir; the area around Tumalo Reservoir, the area northeast of Sisters; the public lands along the east – west corridor extending through La Pine State Park.

Alternative 5

Indirect Effects

Local Transportation
In some cases, areas that have a non-motorized recreation emphasis and a primary wildlife emphasis may see a greater reduction of local roads.

The following narrative describes the management levels that will influence the allowable road densities for local transportation planning:

- **Non-Motorized Recreation Emphasis Areas** – the area northeast of Sisters; the area around Tumalo Reservoir; the area adjacent to Cline Buttes; the area between the Powell Butte Highway and Dodds Road; the area southeast of Bend and north of Golden Basin; and the area southeast of Prineville Reservoir;
- **Non-Motorized Recreation Exclusive Areas** - the area southeast of Bend and south of Golden Basin; the public lands on Powell Buttes; a large block along the Crooked River canyon between Prineville and Bowman Dam; the public lands between the Cline Buttes Highway and the Deschutes River; the Steamboat Rock area, the Smith Rocks area; and areas along the Crooked and Deschutes River.
- **Wildlife Primary Emphasis Management Areas** - includes the Badlands WSA, south to the National Forest boundary; a large block along the Crooked River canyon between Prineville and Bowman Dam; the area around Tumalo Reservoir; the area northeast of Sisters; the Steamboat Rock area, the Smith rock area; the public lands along the east – west corridor extending through La Pine State Park.

Alternative 6

Indirect Effects

Local Transportation
In some cases, areas that have a non-motorized recreation emphasis and a primary wildlife emphasis may see a greater reduction of local roads.

The following narrative describes the management levels that will influence the allowable road densities for local transportation planning:

- **Non-Motorized Recreation Emphasis Areas** – the area southeast of Bend and north of Golden Basin; the area south of Alfalfa Market Road to Dodds Road; the area southeast of Prineville Reservoir; the area northeast of Sisters; the Steamboat Rock area; the area east of Redmond and north of Hwy 126; the public lands within the east – west corridor extending through La Pine State Park.
- **Non-Motorized Recreation Exclusive Areas** – includes the Badlands WSA, north Millican area, and the Horse Ridge area south of Golden Basin; the public lands on Powell Buttes; a large block along the Crooked River canyon between Prineville and Bowman Dam; the area around Tumalo Reservoir; the Smith Rock area; areas along the Crooked and Deschutes River; and many scattered, isolated parcels through out the planning area.
- **Wildlife Primary Emphasis Management Areas** - includes the Badlands WSA, south to the National Forest boundary; east to the North Millican area and southeast of Prineville Reservoir; a large block along the Crooked River canyon between Prineville and Bowman Dam; the area around Tumalo Reservoir; the area northeast of Sisters; the Smith Rocks area; and most of the public lands in the La Pine basin, except those east of the La Pine core area.

Alternative 7

Indirect Effects

Local Transportation
In some cases, areas that have a non-motorized recreation emphasis and a primary wildlife emphasis may see a greater reduction of local roads.

The following narrative describes the management levels that will influence the allowable road densities for local transportation planning:

- **Non-Motorized Recreation Emphasis Areas** – the area southeast of Bend and north of Golden Basin; the area from the Alfalfa Market Road north to the Powell Butte Highway; the area northeast of Sisters; the area southeast of Prineville Reservoir extending south to Hwy 20 adjacent and west of Hwy 27; the northern portion of the La Pine basin.
- **Non-Motorized Recreation Exclusive Areas** – includes the Badlands WSA; the Horse Ridge area south of Golden Basin; the area south of Alfalfa Market Road to Dodds Road; a large block along the Crooked River canyon between Prineville and Bowman Dam; the area around Tumalo Reservoir; the area east of the Cline Falls Highway to the Deschutes River; the Smith Rocks area; areas along the Crooked and Deschutes River; the area east of Redmond, north of Hwy 126 and west of the North Unit Main Canal; and many scattered, isolated parcels through out the planning area. .
- **Wildlife Primary Emphasis Management Areas** - includes the area from Alfalfa Market Road south, with the Badlands WSA, to the National Forest boundary; east to the North Millican area and southeast of Prineville Reservoir; a large block along the Crooked River canyon between Prineville and Bowman Dam; the area around Tumalo Reservoir; the area northeast of Sisters; the Smith Rocks area; the area east of the Cline Falls Highway to the Deschutes River; and most of the public lands in the La Pine basin, except those east of the La Pine core area.

Alternatives 4 – 7

Regional transportation
These alternatives provide for the allocation of a transportation corridor that would extend from south Redmond to the interchange at Deschutes Junction on Hwy 97 with an interchange at Quarry road. Mitigation would require Deschutes County to vacate 19 miles of historic road segments. ODOT analysis indicates that this alternative would improve current and projected traffic problems associated with the Yew avenue interchange. This is a component to the preferred alternative in the ODOT study, Yew Avenue to Deschutes Market Road Analysis for Highway 97 from MP 121.89 to MP 130.18.

Allocation of the corridor that would allow for an arterial from south Redmond to an interchange at Quarry road and Highway 97, plus the extension of an arterial south to the interchange at Deschutes Junction and Highway 97. There would be no access from the arterial to the adjacent public lands.

Direct Effects

Regional Transportation
The south Redmond to Deschutes Junction corridor would be (¼) mile wide on each side of the centerline of the Burlington Northern-Santa Fe (BNSF) railroad right-of-way.

In Alternatives 4-7, both corridor allocations are proposed with mitigation that would require Deschutes County to vacate segments of the following historic roads located in T.16-17 S., R.13 E.:

Horner Road - 9 miles
Powell Butte - Paulina Creek Road, 8 miles
Morrill Road - 2 miles

Indirect Effects

Regional Transportation
This alternative would have similar indirect effects as the allocation of a transportation/utility corridor from South Redmond to Deschutes Junction, as described in Alternatives 2 and 3 above.

Cumulative Effects

Regional Transportation
This alternative would have similar cumulative effects as the allocation of a transportation/utility corridor from South Redmond to Deschutes Junction, as described in Alternatives 2 and 3 above.

ODOT's analysis indicates that this alternative would improve current and projected traffic problems. The preferred alternative in the Yew Avenue to Deschutes Market Road Analysis for Highway 97 from MP 121.89 to MP 130.18 includes an extension of 19th Street south to a proposed interchange at the US 97/Quarry Road intersection and then approximately another four miles to the south to the interchange at Deschutes Junction.

Public Health and Safety

Summary

The public health and safety discussion in this RMP is limited to firearm discharge (both target shooting and hunting), dumping, campfires, and authorities provided to BLM law enforcement rangers. To improve document readability and increase understanding of the issues, these four topics are discussed in the public health and safety section in their entirety (e.g. recreation management related to firearm discharge, dumping, and campfires are also discussed in this section). In addition, other sections address public health and safety concerns, e.g. the fuels section discusses the dangers of wildland fire related to lightning.

The effects of firearm discharge management are important in regard to public health and safety, vegetation and wildlife concerns, and recreation. Rapidly increasingly human populations will further accentuate the need to examine the effects of firearm discharge management.

The direct and indirect effects of each alternative in regard to firearm discharge will primarily result in closures to all firearm discharge, or to firearm discharge unless legally hunting. Since the alternatives vary primarily by the number of acres in each of the two types of closures, the types of effects are generally the same for each alternative, although a few site-specific notes have been made.

Assumptions

Definitions

Hunting is defined as an attempt to take wildlife during a designated season, with a valid license.

Table 4 -25: Summary of acres (and percent of acres) closed to all firearm discharge (FD), and closed to firearm discharge unless legally hunting.

	Common to All Alts.	Alt. 1	Common to Alts. 2-7	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Closed to all FD	590 (<1%)	710 (<1%)	4,779 (1%)	4,779 (1%)	8,418 (2%)	8,418 (2%)	8,418 (2%)	6,411 (2%)	10,500 (3%)
Closed to FD unless legally hunting	527 (<1%)	3,646 (1%)	14,551 (4%)	19,684 (5%)	120,333 (30%)	22,236 (6%)	109,010 (27%)	57,674 (14%)	82,631 (20%)

Note: Alternative 1 and CT Alt 2-7 figures include closures in CTA. Alternative 2, 3, 4, 5, 6, and 7 figures include closures in CTA and CT Alt 2-7. Figures for areas closed to all firearm discharge include 290 acres of seasonal raptor closures.

Closure to firearm discharge would not apply to a person conducting the official business of BLM personnel or their designee, including but not limited to a person acting in defense or protection of an individual, dispatching a critically injured animal for humane purposes, or dispatching a dangerous or damage-causing animal. The closure would also not apply to discharge of projectiles with a limited range where the projectile is likely to hit the ground before hitting unintended targets, including but not limited to bows or compound bows, slingshots, BB guns, or paintball guns. Closures would also not apply to discharge of weapons utilizing "blank" ammunition where no projectile is discharged, including but not limited to blanks for dog training purposes, or blanks used by the Military for official training purposes.

Closed to firearm discharge unless legally hunting will not prohibit year-round hunting of "unprotected mammals and birds".

Visitors are defined as members of the public on BLM-administered public land in the planning area.

Assumptions about the recreational experience, and about conflicts with other uses and adjacent landowners

Many firearm discharging visitors enjoy returning to the identical site time after time.

While many visitors engaging in firearm discharge ensure they shoot in a safe manner and clean up their trash, some of these visitors are not safety conscious, damage natural and cultural resources, and do not remove their trash. Additionally, within the population of visitors discharging firearms on BLM-administered land, hunters are assumed to leave behind a relatively small amount of the firearm discharge-related trash observed within the planning area.

The rapid increase of human populations in Central Oregon is expected to exacerbate conflicts between those who enjoy and support discharging firearms on BLM land, and those who do not.

Perceptions of safety and solitude are more likely when firearm discharge is predictable (occurs at specific locations and/or primarily during fall big-game hunting seasons).

Areas closed to all firearm discharge will most benefit those visitors uncomfortable with firearm discharge, especially in respect to perceived personal safety.

Overall effects of closures to all firearm discharge on availability of recreational opportunities will be minimal because these closures are limited, and opportunities for firearm discharge will continue to exist nearby.

Areas closed to firearm discharge unless legally hunting will allow year-round hunting ("unprotected mammals and birds"), reducing perceptions of safety and natural quiet.

Areas without firearm discharge restrictions will provide the greatest opportunities for target shooting and hunting recreationists.

Firearm discharge closures in areas of moderate recreational use, with limited inholdings or adjacent landowners, will have greater positive effects on solitude than closures of similar acreage with intense recreational use, with numerous inholdings or adjacent landowners.

Firearm discharge closures in urban areas (areas with intense recreational use, and numerous access points and adjacent landowners) were evaluated as having greater positive effects on the availability of recreation than closures in areas of similar acreage with more rural characteristics (moderate recreational use, few access points, and adjacent landowners)

Visitors displaced by closures of BLM-administered land to firearm discharge will continue to engage in firearm discharge activities in other adjacent areas where firearm discharge is legal, as opposed to participating in a different activity within the firearm discharge closure area.

Firearm discharge closures in areas with intense recreational use and/or a relatively rare recreational experience will increase the availability of diverse recreation opportunities more than closures of similar acreage in areas of moderate recreational use and/or a common recreational experience. For example, a firearm discharge closure in the Badlands would have greater positive impacts to the diversity of recreation because Wilderness Study Areas are rare in the planning area, as opposed to a closure of similar acreage in the Bend-Redmond block, where recreational substitutes are relatively common.

Firearm discharge closures in areas with intense recreational use and numerous privately owned inholdings and adjacent landowners would increase the compatibility of recreation than closures of similar acreage in areas of moderate recreational use and moderate amounts of inholdings and adjacent landowners.

Except for hunting, most firearm discharge is a vehicle-dependant activity because most participants want their vehicles immediately adjacent to their shooting area for easy access to supplies. This means areas closed to all motorized travel and closed to firearm discharge unless legally hunting will have limited additional effect on the availability of recreational opportunities above the effects associated with the motorized closure alone.

Assumptions about management, including implementation

All visitors, including visitors engaging in firearm discharge, prefer the BLM to utilize the least amount of management control possible and still achieve the conditions for which the area is managed.

ODF&W uses recreational hunting as a tool to monitor and control game species; this tool would not be used in areas closed to all firearm discharge. Areas closed to firearm discharge unless legally hunting will have a minimal effect on wildlife.

Firearm discharge is generally easier to manage in rural areas than in urban areas because urban areas generally include an increased density of recreationists, increased diversity of recreational uses, increased diversity of land uses, and increased number of adjacent landowners (especially adjacent residential landowners).

Providing a diversity of recreation opportunities is dependent upon the BLM and its partners providing facilities, services, and active resource and social management. Without active recreation management including specially-designated use areas, designated trails, and public information on road and trail systems, the resulting recreation setting will offer a high degree of freedom of choice, but will also result in limited opportunities for many types of recreation. There is good evidence to show this is already happening in some places within the planning area.

Areas closed to firearm discharge unless legally hunting will be more difficult to enforce than closures to all firearm discharge, since it may not be clear that someone is violating a closure unless he/she is contacted personally.

Areas closed to firearm discharge unless legally hunting may be more confusing to visitors, placing additional pressure on BLM's limited law enforcement staff. In addition, alternatives that close more acreage to firearm discharge, campfires, and dumping will be less understandable and enforceable than alternatives with fewer closures.

Implementation of firearm discharge closures will require an understanding of access points, posting of signs, and working with volunteer/Adopt-an-Open-Space groups for information distribution and feedback.

In general, alternatives closing the most acreage to firearm discharge, campfires, and dumping will be less implementable than alternatives with fewer restrictions. Implementability refers to the potential difficulty of the Prineville BLM office to successfully implement direction provided in this section.

Closures delineated by easily identifiable boundaries (e.g. natural features, roads) will be more understandable, enforceable, and implementable because both the public and BLM staff will more readily understand which restrictions apply to which geographic areas. This closure identifiability should not vary by alternative, except in relation to the total acreage closure of the alternative.

Assumptions about impacts to natural resources

Vegetation:
- Trees and other vegetation will experience a limited number of firearm discharge related injuries and loss in areas open to all firearm discharge, especially by those who are not hunting.
- Areas closed to all firearm discharge will provide the greatest protection to vegetation. Areas closed to all firearm discharge unless legally hunting will provide a limited amount of protection.

Wildlife:
- In areas closed to all firearm discharge, hunting will no longer be available to control wildlife populations, especially game species, and the recreational aspects of hunting will be lost.
- Areas closed to firearm discharge unless legally hunting will have a minimal effect on wildlife.

Distinct Natural Land Forms:

- Firearm discharge closures in areas of topographical relief, with intense recreational use and numerous adjacent landowners were evaluated as having greater positive effects on distinct natural land forms than closures of similar acreage without topographical relief, and/or moderate recreational use and limited adjacent landowners.

Assumptions about cumulative effects analysis area

The Public Health and Safety cumulative effects analysis area includes the entire UDRMP planning area, and a limited amount of additional USFS acreage. Within the planning area, other public land parcels will be included in the cumulative effects analysis, including lands managed by Oregon State, Bend Metro Parks and Recreation District, the Central Oregon Parks District, and the Bureau of Reclamation. Additional areas outside of the UDRMP boundary include the Deschutes National Forest close to Sisters and Bend, and parts of the Crooked River National Grasslands near Crooked River Ranch. These non-BLM areas are included in the cumulative effects analysis because they are within the Central Oregon urban interface area, are subject to similar urban types of pressures, and are readily accessible by the same visitors recreating on BLM lands within the planning area.

Incomplete or Unavailable Information

Very little data was available for the following Public Health and Safety effects analysis, limiting the extent and scope of the effects analysis, and making it difficult to know how best to manage firearm discharge to limit conflicts.

Although popular target shooting sites in the planning area are known, the total number of target shooting sites and the total number of target shooters is unknown.

Only minimal information is available concerning the demographics and preferences of target shooters and hunters in Central Oregon. This limits inferences about how visitors presently engaging in firearm discharge would react if their traditional use areas are closed. These visitors might: visit a nearby managed shooting range, drive additional miles to engage in the same activities on nearby public lands, or forgo the opportunity to discharge firearms.

Only minimal information is available about the concerns and preferences of non-firearm discharging recreationists in Central Oregon.

It is important to note that the following comparison of the alternatives with respect to firearm discharge does not necessarily reflect a comparison of how much firearm discharge will occur. There is no known direct correlation between the number of acres available for firearm discharge, and the amount of firearm discharge that would occur. Because of these limitations it is impossible to quantify the firearm discharge impacts of each alternative because the number of current and future firearm dischargers and firearm discharge sites is unknown.

The discussion of the effects of dumping solid and hazardous waste is similarly difficult to that of firearm discharge. While the Public Health and Safety Issue Team observed that dumping activities seem to be connected with full-sized vehicle access, there is no known direct correlation between the amount of solid and hazardous waste left on BLM lands, and the number of acres available for full-sized vehicle access. While generalities can be made, dumping within the planning area is widespread and highly changeable. Although the Public Health and Safety alternative discussion has noted historical, problematic dumping areas, site-specific closures to user-created travelways have not been established. However, in the Recreation alternative section, as a means to provide

a diversity of recreation settings, specific areas have been identified as being managed for exclusive non-motorized use (see the Recreation Alternative Summary Table, Table 4-22). These areas would be closed to all motor vehicles, presumably providing a de-facto closure to dumping. The difficulty lies in the process of quantifying the effects of dumping related to these non-motorized closures. Some areas slated for motor vehicle closures to provide recreation setting goals are highly impacted by dumping, while other areas experience extremely little or no dumping. Because of these limitations it is impossible to quantify the dumping impacts of each alternative because the amount of dumping per acre is variable, and unknown.

Finally, both the Access and Transportation, and Recreation sections include additional direction relevant to the dumping of solid and hazardous wastes. That language includes the designation of a road and trail system, with reduced numbers of access points, and reduced numbers of redundant, user-created travelways. While site-specific closures and designation of a particular trail system are beyond the scope of this Plan, the combination of the above actions is expected to reduce dumping within the planning area. This is because (1) there will be fewer access points for dumpers to legally access BLM land, and (2) concentrating use on the remaining approved roads and trails is expected to result in an actual increase, or perceived increase in the number dumpers being identified and cited for dumping. While the effects are impossible to quantify, it is reasonable to assume that generally an increase in the amount of BLM land closed to full-sized vehicle access should result in a reduced amount of solid and hazardous waste dumped on BLM Prineville land.

Analysis of Alternatives

Common to All Alternatives

Firearm Discharge
Firearm discharge closures Common to All Alternatives are a continuation of management direction provided in Federal Register closures established after the completion of the Brothers/La Pine RMP.

The direct effect of these four firearm discharge closures is to prohibit all firearm discharge on 590 acres, and firearm discharge unless legally hunting on 527 acres. This management direction provides limited protection for natural and cultural resources, few opportunities for land users to experience natural quiet and increased perceived safety (therefore, little diversity of recreation opportunities), and limited compatibility in recreation emphasis.

Indirectly these Common to All Alternative firearm discharge closures would be expected to displace a small amount of firearm discharge, but the extent of this displacement is unknown.

Alternative 1

Firearm Discharge
Alternative 1 would include two closures in addition to the four closures that are common to all alternatives. The direct effect of these six firearm discharge closures in Alternative 1 is to prohibit opportunities for all firearm discharge on 710 acres, and firearm discharge unless legally hunting on 3,646 acres. These closures provide less resource and cultural protection, fewer opportunities for land users to experience natural quiet and increased perceived safety, less diversity of recreation opportunities, and less recreation compatibility than any other alternative. Alternative 1 has the least acres closed to firearm discharge, and would therefore be expected to be the most understandable, enforceable, and implementable of all the alternatives.

Indirectly, these Alternative 1 firearm discharge closures are expected to displace less firearm discharge to other geographic areas than all other alternatives, but the extent of those displacements is unknown. Cumulatively these closures to firearm discharge on BLM-administered land, along with similar closures implemented by other land management agencies within the cumulative effects analysis area, would be expected to provide more regional opportunities to discharge firearms than any alternative. Alternative 1 is expected to produce more conflicts among recreational users and between recreational users and adjacent landowners than any other alternative.

Campfires

Alternative 1 includes an existing Federal Register notice that closed 3,119 acres of the Lower Crooked and Middle Deschutes Wild and Scenic Rivers (WSR) to campfires between June 1 and October 15. This Alternative provides the greatest opportunities for campfires of any alternative, but also the least amount of wildfire protection related to campfires. Crooked River Ranch (CRR), a subdivision situated on a peninsula of land between the Lower Crooked and Middle Deschutes rivers, normally closes its boundaries to campfires between June 1 and November 1. This means CRR and the WSR corridors are closed to campfires, but the intermixed BLM uplands areas are open to campfires, which is confusing to the public and difficult to enforce.

Dumping

The alternatives do not include any specific actions related to dumping in Alternative 1; however, closures to motorized vehicles described in the Recreation section are expected to have indirect effects on dumping. In Alternative 1 11,111 acres, or about 3 percent of the planning area would be managed for exclusive non-motorized use, effectively closing these areas to motorized vehicles, resulting in a probable reduction in the amount of waste dumped within the planning area. Although a quantitative analysis is not possible, it is reasonable to assume Alternative 1 would contribute to more dumping than any other alternative. Compared to the other alternatives, these limited closures provide the least amount of natural resource protection, and the least opportunity for visitors to experience an aesthetic natural landscape. Alternative 1 is expected to require the least amount of engineering and design, but the greatest amount of ranger presence and enforcement.

Common to Alternatives 2-7

Actions Common to All Alternatives include:

- Closure of some small, isolated blocks to all firearm discharge in areas of threatened natural or cultural resources, high visitation, and user conflicts;
- Closure of ACECs, RNAs, WSRs, and other special areas to firearm discharge unless legally hunting; and
- Closure of ACECs, RNAs, and other highly developed sites to campfires year-round, and closes the Middle Deschutes and Lower Crooked Wild and Scenic River corridors and adjacent uplands to campfires.

Firearm Discharge

All action alternatives would result in closing 4,779 acres of BLM land to all firearm discharge, and 14,551 acres to firearm discharge unless legally hunting. Compared with current management, these closures would provide additional but limited natural resource and cultural protection, additional but limited opportunities for land users to experience natural quiet and increased perceived safety, additional but limited diversity of recreation opportunities, and additional but limited recreation compatibility.

Indirectly these Common to Alternative 2-7 firearm discharge closures would be expected to displace more firearm discharge activity to other geographic areas than would Alternative 1. Because the closures common to all action alternatives generally focus on small, isolated parcels adjacent to residential areas with high rates of recreational use, most of the displaced firearm discharge use is expected to move to larger blocks of

BLM land, in areas with relatively fewer recreationists and adjacent residents. While the location and extent of these displacements is unknown, it is reasonable to assume some firearm dischargers will move to nearby BLM lands, including the Cline Buttes and Bend-Redmond blocks. Cumulatively these BLM closures to firearm discharge, along with similar closures implemented by other land management agencies within the cumulative effects analysis area, will have a greater reduction on the regional opportunities to discharge firearms than Alternative 1. Under this approach the predicted increase in human populations, residential development, and recreational use of natural areas in Central Oregon is expected to result in greater firearm discharge related conflicts among recreational users, and between recreational users and adjacent landowners than Alternative 1.

There are cumulative effects related to the guidelines described in the Reducing Risk in Residential Areas section (in Chapter 2). That section describes a mechanism whereby residents living in subdivisions adjacent to BLM-administered land may close their subdivision to all firearm discharge, and then request the appropriate local government to lawfully establish those closures under formal land use processes. With legal closures in place, local governments could then request BLM to extend the existing private land closure with a firearm discharge closure on BLM-administered land. Because only a limited number of subdivisions adjoining Prineville BLM-administered land have presently closed their boundaries to firearm discharge, only 2,421 acres of BLM land would qualify for a firearm discharge closure of this type at this time. These closures would be expected to reduce firearm discharge opportunities more than in Alternative 1. Additional subdivisions may engage in this process in the future; however, the location and extent of these actions is unknown, as are the possible cumulative effects.

A final firearm discharge cumulative effect discussion centers on proposed closures adjacent to the Lower Crooked Wild and Scenic River corridor. The 1992 Lower Crooked Wild and Scenic River (Chimney Rock Segment) Management Plan directed that discharge of firearms and hunting would be limited to state waterfowl, big game, and upland game seasons. While those river closures have yet to be put in place, there is an expectation that those closures will be implemented in the future. Cumulatively the existing WSR direction combined with the proposed RMP firearm discharge closures would restrict target shooting in the area between the Lower Crooked WSR and the Prineville Reservoir (2,763 acres) to a greater extent than Alternative 1. Although additional acreage is being closed to firearm discharge in all action alternatives, the continuity of regulations from river to upland area means the Alternative 2-7 approach would be more understandable, enforceable, and implementable than Alternative 1.

Campfires

The Common to Alternatives 2-7 approach would close an additional 7,113 acres to campfires over Alternative 1, moderately reducing opportunities to enjoy campfires, and providing minimal additional wildfire protection. Indirectly, however, these closures would simplify campfire regulations in the main Steamboat block, and throughout the Smith Rock block. These simplified campfire regulations would make this approach more understandable, enforceable, and implementable than Alternative 1. This approach would also reduce the need for BLM law enforcement officers to educate visitors and enforce the regulations.

Law Enforcement Authority

The Common to Alternatives 2-7 approach would provide BLM law enforcement rangers with increased authority to enforce existing Oregon state and local laws above what is provided in Alternative 1. The indirect effects of this approach would be an increased enforcement of Oregon state and local laws on BLM-administered land, and increased consistency of enforcement of Oregon state and locals laws between BLM and non-BLM-administered lands above Alternative 1, although neither of those effects cannot be quantified. From a cumulative standpoint the predicted increase in human populations

and associated increase in recreational use on BLM-administered lands would mean any increase in enforcement of regulations should have a future exaggerated effect above Alternative 1.

Dumping

Alternatives 2-7 would not result in any direct effects, because these alternatives do not identify any site-specific actions. However, closures to motorized vehicles described in the Common to Alternatives 2-7 Recreation section would be expected to have indirect effects on dumping. Areas managed for exclusive non-motorized use would be closed to motorized vehicles, resulting in a probable reduction in the amount of waste dumped within the planning area. In addition, it is probable that an additional number of user-created travelways leading to habitual dumping areas will be closed, either to all vehicles, or at least to full-sized vehicles above the direction provided in Alternative 1. If implemented, these closures would be completed utilizing fences, boulders, and signs. The effects of these probable actions include a reduction in dumping in the closed areas, and a displacement of illegal dumping to adjacent areas, leading to an increase in dumped materials in those adjacent areas. Cumulatively, one can expect that as human populations in Central Oregon increase, so will the amount of illegal dumping. In addition, the Social and Economic Impact Analysis Report for the Upper Deschutes RMP/EIS predicts an increase in the number of people living in poverty, and an increase in the cost of housing. From these predictions one can reasonably assume the poorest Central Oregon residents will experience a decrease in the amount of income available for waste disposal, resulting in an increase in the amount of dumping occurring on BLM lands within the planning area.

Alternative 2

Firearm Discharge

Alternative 2 has six additional areas (5,133 acres) closed to firearm discharge unless legally hunting above those closed in Common to Alternatives 2-7. These closures are generally proximal to urban areas; two of them are managed as ACECs. Compared to current management, these closures provide additional natural and cultural resource protection, and allow for increased opportunities for land users to experience natural quiet and increased perceived safety. In conjunction with motorized closures, this alternative would increase the diversity of recreation opportunities above Alternative 1 by establishing urban, non-motorized areas closed to firearm discharge unless legally hunting. Compatibility would also be improved by providing non-motorized users an opportunity to recreate where the only firearm discharge allowed is hunting. Because of the limited number of closures, this alternative would be more understandable, enforceable, and implementable than the other action alternatives.

Compared to existing management the indirect effects of Alternative 2 firearm discharge closures include minor additional displacement of target shooters from generally small, urban BLM-administered lands with relatively high amounts of recreational use. Although the exact location and amounts of the displacement is unknown, the closures primarily occur on BLM-administered lands between Bend and Redmond, making it reasonable to assume at least some of those target shooters would move to adjacent BLM-administered lands in the Cline Buttes and Bend-Redmond blocks. Cumulatively these closures, along with similar closures implemented by other land management agencies within the cumulative effects analysis area, would be expected to minimally reduce the regional opportunities to discharge firearms above current management, although it is impossible to quantify these effects. Under Alternative 2 the predicted increase in human populations, residential development, and recreational use of natural areas in Central Oregon would be expected to result in the greatest firearm discharge related conflicts among recreational users, and between recreational users and adjacent landowners, except for Alternative 1.

Dumping
There are no specific actions related to dumping in Alternative 2; however, closures to motorized vehicles described in the Recreation section are expected to have indirect effects on dumping. In Alternative 2, 25,699 acres or 6 percent of the planning area would be managed for exclusive non-motorized use, effectively closing these areas to motorized vehicles, resulting in a probable reduction in the amount of waste dumped within the planning area. In addition, it is probable that an additional number of user-created travelways leading to habitual dumping areas will be closed, either to all vehicles, or at least to full-sized vehicles above the direction provided in Alternative 1 (see Common to Alternatives 2-7). If implemented, these closures would be completed utilizing fences, boulders, and signs. Although a quantitative analysis is not possible, it is reasonable to assume Alternative 2 would allow the second-most amount of dumping of any of the alternatives. Compared to the other alternatives, these limited closures provide the second-least amount of natural resource protection and opportunity for visitors to experience an aesthetic natural landscape. Alternative 2 would be expected to require the second-least amount of engineering and design, but the second-greatest amount of ranger presence and enforcement.

Alternative 3

Firearm Discharge
This alternative would close 128,751 acres, or 30 percent of the planning area, to firearm discharge, the most acreage of any alternative. That acreage includes 8,418 acres closed to all firearm discharge, and 120,333 acres closed to firearm discharge unless legally hunting. Five of the six areas closed to firearm discharge unless legally hunting in Alternative 2 would be closed to all firearm discharge here. These closures would be especially important given their proximity to urban areas and the expected demographic changes predicted for the Central Oregon. In addition, Alternative 3 would close the Badlands, the Tumalo block, most of the La Pine block, and parts of the Mayfield and Millican Plateau blocks to firearm discharge unless legally hunting. Compared to Alternatives 1 and 2, these actions would improve natural resource protection by providing additional protection to vegetation and wildlife. Combined with closures to all motorized travel, these firearm discharge closures would provide the most recreational opportunities for experiencing non-motorized, target shooting-free areas, emphasizing natural quiet, high visual quality, and increased perceived safety in the planning area. From a compatibility perspective, these closures separate different user groups thereby reducing user conflicts. Compatibility would be emphasized because this alternative separates users to a great degree, reducing user conflicts, but less so than in Alternatives 7 and 5. Because of the additional firearm discharge closures, this alternative would be equally difficult to understand and enforce as Alternatives 5 and 7. Alternative 3 would be the second-least implementable, requiring nearly the greatest management presence (behind Alternative 5).

Compared to the other alternatives, Alternative 3 firearm discharge closures would be expected to displace the second-greatest amount of firearm discharge. Although the exact location and amounts of displacement is unknown, critical Alternative 3 closures would occur in the Steamboat Rock block, and parts of the Mayfield and Cline Buttes blocks, making it reasonable to assume some target shooters will move to adjacent BLM lands in the Bend-Redmond block, and sections of the Mayfield and Cline Buttes blocks still open to firearm discharge activities. Cumulatively these BLM closures to firearm discharge, along with similar closures implemented by other land management agencies within the cumulative effects analysis area, would be expected to moderately reduce regional opportunities to discharge firearms, especially target shooting opportunities. Again, while these effects are not quantifiable, it is reasonable to assume the predicted increase in human populations, residential development, and recreational use of natural

areas in Central Oregon will increase firearm discharge related conflicts among users, and between recreational users and adjacent landowners above the level of conflict without a population increase.

Dumping

The alternatives do not include any specific actions related to dumping in Alternative 3; however, closures to motorized vehicles described in the Recreation section would be expected to have indirect effects on dumping. In Alternative 3, 81,619 acres, or about 20 percent of the planning area would be managed for exclusive non-motorized use, effectively closing these areas to motorized vehicles, resulting in a probable reduction in the amount of waste dumped within the planning area. In addition, it is probable that an additional number of user-created travelways leading to habitual dumping areas would be closed, either to all vehicles, or at least to full-sized vehicles above the direction provided in Alternative 1 (see Common to Alternatives 2-7). If implemented, these closures would be completed utilizing fences, boulders, and signs. Although a quantitative analysis is not possible, based on acres closed to motorized use, it is reasonable to assume Alternative 3 would have less impact on dumping than Alternatives 6, and 7, but more impact than Alternatives 1, 2, 4, and 5. Compared to the other alternatives, these motorized closures would provide the third most amount of natural resource protection, and the third most opportunity for visitors to experience an aesthetic natural landscape. Alternative 3 would be expected to require the third-most amount of engineering and design, but the fifth-least amount of ranger presence and enforcement. Finally, the Recreation section in Alternative 3 closes the main Steamboat Rock block to full-sized vehicles only (while still allowing OHV use); this approach would continue to provide motorized recreation opportunities while reducing the amount of dumping.

Alternative 4

Firearm Discharge

This alternative would close an identical amount of area to all firearm discharge as Alternative 3 (8,418 acres); however, Alternative 4 only closes a limited amount of acreage to firearm discharge unless legally hunting above Common to Alternatives 2-7 (3,639 acres). Except in the Steamboat Block these closures provide less protection to natural and cultural resources than Alternative 3, but more than Alternative 2. Compared to 3, Alternative 4 would also reduce the diversity and compatibility of recreational opportunities by limiting the separation of uses, and establishing special areas managed for particular experiences. Overall aesthetic values would also be reduced compared to Alternative 3, because natural quiet, visual quality and perceived safety would not be provided for to the same degree. The one exception to the general trend in Alternative 4 would be Steamboat Rock. Additional acreage closure in the main Steamboat Rock block to firearm discharge unless legally hunting would improve natural resource protection, provide additional recreational opportunities, improve the aesthetic values of the natural landscape, and improve recreational compatibility in this part of the planning area. Alternative 4 would require more management presence than Alternative 2, but less than Alternatives 3, 5, 6, and 7. Alternative 4 would be easier to understand and enforce, and more implementable than Alternatives 3, 5, 6, and 7, but more difficult to understand and enforce and less implementable than Alternative 2.

Compared to the other alternatives, Alternative 4 firearm discharge closures are expected to displace a relatively small amount of firearm discharge. Although the exact location and amounts of displacement is unknown, based on acres of closure one can expect Alternative 4 would displace more firearm discharge than Alternative 2, but less than Alternatives 3, 5, 6, and 7. The only substantial closure above Common to Alternatives 2-7 would be in the Steamboat Rock area, making it reasonable to assume some target shooters would move to adjacent BLM-administered land in the Bend-Redmond and Cline Buttes blocks. In comparison to the other alternatives, the cumulative effects

of these BLM closures to firearm discharge, along with similar closures implemented by other land management agencies within the cumulative effects analysis areas, are expected to be relatively minor. Again, while these effects are not quantifiable, it is reasonable to assume the predicted increase in human populations, residential development, and recreational use of natural areas in Central Oregon would increase firearm discharge related conflicts among users, and between recreational users and adjacent landowners.

Dumping
With respect to dumping, the alternatives do not include any specific actions in Alternative 4; however, closures to motorized vehicles described in the Recreation section would be expected to have indirect effects on dumping. In Alternative 4, 28,091 acres, or 7 percent of the planning area would be managed for exclusive non-motorized use, effectively closing these areas to motorized vehicles, resulting in a probable reduction in the amount of waste dumped within the planning area. In addition, it is probable that an additional number of user-created travelways leading to habitual dumping areas would be closed, either to all vehicles, or at least to full-sized vehicles above the direction provided in Alternative 1 (see Common to Alternatives 2-7). If implemented, these closures would be completed utilizing fences, boulders, and signs. Although a quantitative analysis is not possible, based on acres closed to motorized use, it is reasonable to assume Alternative 3 would have less impact on dumping than Alternatives 3, 5, 6, and 7, but more impact than Alternatives 1 and 2. Compared to the other alternatives, these motorized closures would provide the third-least amount of natural resource protection, and the third-least opportunity for visitors to experience an aesthetic natural landscape. Alternative 3 would be expected to require the third-least amount of engineering and design, but the fifth-most amount of ranger presence and enforcement. Finally, the Recreation section in Alternative 4 closes the main Steamboat Rock block to full-sized vehicles only (while still allowing OHV use), providing continued motorized recreation opportunities while reducing the amount of dumping.

Alternative 5

Firearm Discharge
This alternative closes the second most acres of BLM-administered land to firearm discharge. While Alternative 5 would include identical closures to all firearm discharge as established in Alternative 3 (8,418 acres), it would close a different set of acres to firearm discharge unless legally hunting (109,010 acres). This alternative would provide for the second most compatibility between recreational users, and between recreational users and adjacent landowners in urban and residential areas (Alternative 7 provides the most). This is reflected in Cline Buttes, La Pine, the Mayfield block, and the Crooked River parcels where large areas would be closed to firearm discharge unless legally hunting. Although this alternative would provide improved compatibility because of its increased management of user conflicts in urban and residential areas, overall it would close less land to firearm discharge than Alternative 3, and would not provide as diverse recreational opportunities as Alternatives 3 and 7 (although it would be more compatible and diverse than Alternatives 2, 4, and 6). Natural and cultural resource protection would exceed the protection provided in Alternatives 2, 4, 6, and 7 because a majority of the damage to these resources occurs in proximity to urban and residential centers, and would be largely protected by a closure to firearm discharge unless legally hunting. The aesthetic values of the natural landscape, including solitude and distinctive land forms, would be moderately protected, less than in Alternatives 3 and 7, but more than in Alternative 2, 4 and 6. Because of its proposed firearm discharge closures and urban orientation, Alternative 5 would require the most management presence and would be of equal difficulty as Alternatives 3 and 7 to understand and enforce. Alternative 5 would be the least implementable of any alternative.

Compared to the other alternatives, Alternative 5 firearm discharge closures would be expected to displace the most amount of firearm discharge (behind Alternative 7). Although the exact location and amounts of displacement is unknown, the urban characteristics of the closure areas in Steamboat Rock and Cline Buttes would directly affect the amount of expected displacement. As noted above, Alternative 5 would close fewer acres to firearm discharge than Alternative 3, but more target shooting would occur in Cline Buttes than in the Badlands, hence the change in expected displacement. It is reasonable to assume many of the displaced firearm users would move to adjacent publicly-owned lands, including the Bend-Redmond block of BLM-administered land, and the Crooked River National Grasslands just north of the planning area. In comparison to the other alternatives, the cumulative effects of these BLM closures to firearm discharge, along with similar closures implemented by other land management agencies within the cumulative effects analysis area, would be expected to be substantial. Again, while these effects are not quantifiable, it is reasonable to assume the predicted increase in human populations, residential development, and recreational use of natural areas in Central Oregon will increase firearm discharge related conflicts among users, and between recreational users and adjacent landowners above the level of conflict without a population increase.

Dumping

With respect to dumping, the Public Health and Safety alternatives do not include any specific actions in Alternative 5; however, closures to motorized vehicles described in the Recreation section would be expected to have indirect effects on dumping. In Alternative 5 54,548 acres, or 14 percent of the planning area would be managed for exclusive non-motorized use, effectively closing these areas to motorized vehicles, resulting in a probable reduction in the amount of waste dumped within the planning area. In addition, it is probable that an additional number of user-created travelways leading to habitual dumping areas would be closed, either to all vehicles, or at least to full-sized vehicles above the direction provided in Alternative 1 (see Common to Alternatives 2-7). If implemented, these closures would be completed utilizing fences, boulders, and signs. Although a quantitative analysis is not possible, based on acres closed to motorized use, it is reasonable to assume Alternative 5 would have a greater impact on dumping than Alternatives 1, 2, and 4, but less than Alternatives 3, 6, and 7. Compared to the other alternatives, these motorized closures would provide the fourth-most amount of natural resource protection, and the fourth-most opportunity for visitors to experience an aesthetic natural landscape. Alternative 5 would be expected to require the fourth-most amount of engineering and design, and the fourth-most amount of ranger presence and enforcement.

Alternative 6

Firearm Discharge

This alternative emphasizes effective wildlife habitats outside areas most likely to be affected by residential and urban development. Three of the five urban-related parcels that would be closed to all firearm discharge in Alternatives 3-5 (the airport allotment, the southern parcel in the Tumalo block, and the parcel north of Rickard Road, South of Highway 20) would now be closed to firearm discharge unless legally hunting. This would leave 6,411 acres closed to all firearm discharge, and 57,674 acres closed to firearm discharge unless legally hunting.

This alternative would provide greater protection for vegetation and wildlife than Alternatives 2 and 4, but less than Alternatives 3, 5, and 7. The focus on natural and cultural protection would reduce the compatibility between recreational uses, and allow for more user conflict than Alternatives 3, 5, and 7 but less than Alternatives 2 and 4. The diversity of recreation opportunities would be reduced because of fewer restrictions in the high conflict urban areas, providing less diversity than Alternatives 3, 5, and 7, but more diversity than Alternatives 2 and 4. The protection of aesthetic values of the natural

landscape would be greater than in Alternatives 2 and 4, but less than Alternatives 3, 5, and 7, and would move the area of emphasis from urban to rural. Because management is generally easier in rural areas compared to urban areas, this alternative would require less management presence, be easier to enforce, be easier to understand the regulations compared to Alternatives 3, 5, and 7, and harder than in Alternatives 2 and 4. Implementing this alternative would be easier than Alternatives 3, 5, and 7, but harder than Alternatives 2 and 4.

Compared to the other alternatives, Alternative 6 firearm discharge closures would be expected to displace the third-least amount of firearm discharge, only displacing less than in Alternatives 2 and 4. Although the exact location and amounts of displacement is unknown, this alternative would close the third-least amount of BLM-administered land to firearm discharge, and would not close any previously identified intensive firearm discharge areas. In comparison to the other alternatives, the cumulative effects of these BLM closures to firearm discharge, along with similar closures implemented by other land management agencies within the cumulative effects analysis area, would be expected to be minimal. Again, while these effects are not quantifiable, it is reasonable to assume the predicted increase in human populations, residential development, and recreational use of natural areas in Central Oregon will increase firearm discharge related conflicts among users, and between recreational users and adjacent landowners above the level of conflict without a population increase.

Dumping
With respect to dumping, the Public Health and Safety alternatives do not include any specific actions in Alternative 6; however, closures to motorized vehicles described in the Recreation section would be expected to have indirect effects on dumping. In Alternative 6 83,804 acres, or 21 percent of the planning area would be managed for exclusive non-motorized use, effectively closing these areas to motorized vehicles, resulting in a probable reduction in the amount of waste dumped within the planning area. In addition, it is probable that an additional number of user-created travelways leading to habitual dumping areas would be closed, either to all vehicles, or at least to full-sized vehicles above the direction provided in Alternative 1 (see Common to Alternatives 2-7). If implemented, these closures would be completed utilizing fences, boulders, and signs. Although a quantitative analysis is not possible, based on acres closed to motorized use, it is reasonable to assume Alternative 6 would have a greater impact on dumping than Alternatives 1-5, but less impact than Alternative 7. Compared to the other alternatives, these motorized closures provide the fourth-most amount of natural resource protection, and the fourth-most opportunity for visitors to experience an aesthetic natural landscape. Alternative 5 would be expected to require the fourth-most amount of engineering and design, and the fourth-most amount of ranger presence and enforcement.

Alternative 7

Firearm Discharge
This alternative takes an approach that combines many of the features of the previous alternatives in a manner that attempts to meet, to the greatest degree possible, the needs of all of the issue areas. Of any alternative, Alternative 7 would close the most BLM land to all firearm discharge (10,500 acres), but the third-most acreage to firearm discharge unless legally hunting (82,631 acres). This alternative emphasizes maintaining wildlife habitat, and would provide the second-greatest protection to vegetation and wildlife of all the alternatives. This alternative would also emphasize intensive visitor management, and with the motorized travel closures, provide for nearly maximum recreational opportunities for enjoying natural quiet, high visual quality, and increased perceived safety, behind Alternative 3. From a compatibility standpoint this set of firearm discharge closures would maximize the separation of different user groups, resulting in the greatest reduction of user conflicts. Because this alternative calls for nearly maximum separation of users and management presence, it would be equally difficult to understand and enforce as Alternatives 3 and 5.

Compared to the other alternatives, Alternative 7 firearm discharge closures would be expected to displace the third-greatest amount of firearm discharge. Although the exact location and amounts of displacement is unknown, this alternative would close the most acreage to all firearm discharge, including closures in the Steamboat Rock and Cline Buttes blocks (areas presently utilized by target shooters). In comparison to the other alternatives, the cumulative effects of these BLM closures to firearm discharge, along with similar closures implemented by other land management agencies within the cumulative effects analysis area, would be expected to be the third-greatest of any alternative (behind Alternatives 3 and 5). Again, while these effects are not quantifiable, it is reasonable to assume the predicted increase in human populations, residential development, and recreational use of natural areas in Central Oregon will increase firearm discharge related conflicts among users, and between recreational users and adjacent landowners above the level of conflict without a population increase.

Dumping

With respect to dumping, the Public Health and Safety alternatives do not include any specific actions in Alternative 7; however, closures to motorized vehicles described in the Recreation section are expected to have indirect effects on dumping. In Alternative 7 87,832 acres, or 22 percent of the planning area would be managed for exclusive non-motorized use, effectively closing these areas to motorized vehicles, resulting in a probable reduction in the amount of waste dumped within the planning area. In addition, it is probable that an additional number of user-created travelways leading to habitual dumping areas would be closed, either to all vehicles, or at least to full-sized vehicles above the direction provided in Alternative 1 (see Common to Alternatives 2-7). If implemented, these closures would be completed utilizing fences, boulders, and signs. Although a quantitative analysis is not possible, based on acres closed to motorized use, it is reasonable to assume Alternative 7 would have greatest impact on dumping than any other alternative. Compared to the other alternatives, these motorized closures would provide the greatest amount of natural resource protection, and the greatest opportunity for visitors to experience an aesthetic natural landscape. Alternative 7 would be expected to require the greatest amount of engineering and design, but the least amount of ranger presence and enforcement. Finally, the Recreation section in Alternative 7 would close the main Steamboat Rock block to full-sized vehicles only (while still allowing OHV use). This approach would continue to provide motorized recreation opportunities while reducing the amount of dumping.

Archaeology

Summary

All alternatives would continue management direction to protect archaeological resources from project effects and consult with affected tribes about project undertakings in accordance with existing laws and regulations. Alternative 1 would have the greatest potential for effects to archaeological resources in general, whereas the effects to those resources under Alternatives 2-7 would be much the same. Effects to "at-risk" significant archaeological resources that would be expected under Alternative 1 would be reduced under Alternatives 2-7 due to the designation of ACECs. ACEC designation would limit or eliminate activities that could damage or diminish the integrity of archaeological resources. Similarly, potential for effects to archaeological resources that would be anticipated under Alternative 1 would be reduced under Alternatives 2-7 by emphasizing non-project related surveys. Non-project related surveys would provide much needed information about the kind of effects that are occurring to cultural materials in areas of high probability for the location of significant sites. In addition, the potential to stabilize and interpret "at-risk" significant archaeological resources, in particular, and protect and

preserve non-renewable resources, in general, would be greatly improved as a result of criteria developed for identifying and prioritizing treatment of "at-risk" resources and non-project related surveys.

Assumptions

Archaeological Resources
Each alternative would comply with the various federal laws, regulations, and policies intended to mitigate project effects to archaeological resources.

Archaeological resources would be located, protected, developed, interpreted, and preserved in accordance with existing legal authorities.

Appropriate tribal governments would be consulted to ensure their interests are taken into account prior to decisions to implement plan allocations, goals, and objectives.

Archaeological Resources and "At-Risk" Significant Archaeological Resources

Alternative 1
Under current conditions, impacts that are presently occurring to archaeological resources and "at-risk" significant archaeological resources would continue to diminish the integrity of those resources without additional site-specific decisions to alter uses.

Common to Alternatives 2-7
Most "at-risk" resources are protected by limiting activities that could damage them within the immediate vicinity of the resource or by designating ACECs that would emphasize interpretation or limit activities in large areas.

Conducting non-project related inventories across the planning area would have an overall beneficial effect on all forms of archaeological resources. Such inventories would, at once, provide the BLM with better information about the amount, extent, and nature of those resources within the planning area (and by extension, how best to manage them), while at the same time identify representative samples of archaeological data from which scientifically based conclusions about the past could be established.

Managing significant caves in their natural state with an emphasis on interpretation and, where applicable, for appropriate recreational uses, would have a positive effect on archaeological resources. Currently, all caves within the planning area have not been inventoried to determine their resource values. However, prior to authorizing cave uses, various legal requirements would have to be met to ascertain if public access limitations or restrictions are needed.

Future anticipated actions to fence the Redmond Caves parcel and repair the fence around Pictograph Cave would prevent unauthorized motorized vehicle access to the areas. This limitation to public access would have a positive effect on archaeological resources in general and "at-risk" significant resources in particular. Such limitations would reduce the dumping, vandalism, soil compaction, and other surface disturbance that is occurring under present conditions.

Objectives that include a designated trail system, limited to foot traffic only, for the Steelhead Falls area and closing and rehabilitating user created trails not part of the designated system would have a beneficial effect on archaeological resources. Such a trail system would allow the public to visit much of the area while directing visitors away from fragile, non-renewable resources that are easily damaged.

Interpretive development and education products for "at-risk" significant archaeological resources would have a positive effect for both the public and the resource. Interpretive

development would provide needed measures to stabilize and safeguard threatened resources, while educational products would inform the public about the value, sensitive nature, and geographic importance of those resources.

Analysis of the Alternatives

Archaeological Resources and "At-Risk" Significant Archaeological Resources

Common to All Alternatives

Each alternative makes allocation or management emphasis decisions that would affect the resource base of non-renewable archaeological resources. However, prior to decisions to implement federal or federally licensed undertakings, various laws and regulations require that an agency official take into account the effects of those undertakings on archaeological resources. Similarly, prior to implementation of federal undertakings, various legal authorities require federal agencies to make a reasonable and good-faith effort to take into account the comments and concerns of local Indian tribes to determine if tribal interests would be affected by project activities. The Wagon Roads ACEC in Township 17, Range 12, and Section 1 would continue to protect the historical features for which the ACEC was designated. Other existing ACECs, RNAs, and WSAs would generally have a beneficial effect on archaeological resources where management actions restrict detrimental uses in those areas. Given those considerations, it is expected that effects to archaeological resources would be kept to the minimum allowable by law. Actual effects cannot be quantified until site-specific projects are identified and archaeological surveys, site inventory and documentation is completed.

Alternative 1

Alternative 1 would continue the management direction provided for archaeological resources found in the Brothers/La Pine RMP. Under this alternative the BLM would meet its legal responsibilities to protect archaeological resources from federal or federally licensed ground-disturbing activities. The management strategy to protect archaeological sites from the effects of project activities would be to avoid them through project modifications. Segments of historic Huntington Road would continue to be recognized as an ACEC and subject to the management guidelines found in the Brothers/La Pine RMP. Alternative 1 does not provide guidance about how the BLM would determine the nature of the archaeological resource base across the planning area, or how it would identify and manage "at-risk" significant archaeological resources threatened by human activities or natural processes. Under this alternative, the expected effects to those "at-risk" resources would continue the trends in resource condition as noted in the Affected Environment.

Although Alternative 1 provides minimal legal protection for archaeological resources from federal or federally licensed undertakings through avoidance, it does not provide a management strategy that would 1) reduce non-project related effects to resources due to an increasing local population base and visitation rate to public lands, 2) provide direction for determining the amount, extent, and nature of archaeological resources in the planning area, and 3) develop a criteria for identifying "at-risk" significant archaeological resources and prioritizing them relative to a treatment schedule. Impacts under this alternative would be particularly threatening to "at-risk" significant archaeological resources. Unauthorized motorized and mechanized vehicle access to the Redmond Caves parcel, Tumalo Canals, and Pictograph cave would continue to diminish the integrity of those historical resources unless site-specific mitigations were implemented.

Similarly, without a special management designation for the Tumalo Canals, potential a material site identified for possible gravel extraction immediately adjacent to the

historic canals would affect the local landscape, topographic features, and vegetation, in addition to creating dust and noise. Those activities, in turn, have the potential to affect the integrity of location, design, and feeling that contribute to the significance of the historic feature. In light of those considerations, Alternative 1 would have the greatest potential effect on archaeological resources due to soil compaction, vandalism, artifact collection, erosion, surface disturbance, mineral material extraction, and refuse dumping. By extension, those factors would contribute to a deficiency in resource diversity and information potential.

Common to Alternatives 2-7

Alternatives 2-7 would carry forward the minimal legal responsibilities provided for archaeological resources found in Alternative 1. However, in contrast to that alternative, Alternatives 2-7 establish a more affirmative approach for the management of archaeological resources, in general, and "at-risk" significant archaeological resources, in particular. In keeping with that proactive approach, the Wagon Roads ACEC is carried over into Alternatives 2-7. Here, however, two segments of the existing Wagon Roads ACEC are removed from ACEC designation, due to lack of importance and relevance, and two segments of the historic Horner and Bend/Prineville Roads are added to the Wagon Roads ACEC. Those segments of historic roads that are included in 2-7 are considered eligible to the National Register of Historic Places. Alternatives 2-7 also provide additional proactive management guidance in support of conducting non-project related inventories to determine the amount, extent, and nature of archaeological resources across the planning area.

Alternatives 2-7 establish criteria for identifying "at-risk" significant archaeological resources and recommends a method for prioritizing proactive treatment for those resources. A segment of the historic Tumalo Canals is one such "at-risk" significant resource. The feature is considered eligible to the National Register of Historic Places. Alternative 2-7 would designate approximately 1,050 acres surrounding the historic features. The area would be designated as an individual ACEC only in Alternatives 2, 5, 6, and 7. However, in Alternative 3 and 4 it would be combined with another ACEC where it would receive the same management direction as in Alternatives 2, 5, 6, and 7. Consequently, it would be managed by the same guidelines across all action alternatives. Other identified "at-risk" resources that would be managed in a more proactive manner in Alternatives 2-7 than under existing conditions include: Redmond Caves, Steelhead Falls, and Pictograph Caves. The criteria developed to manage "at-risk" significant archaeological resources also provides for including additional significant, threatened resources to the list, should those resources be discovered during future inventories. Similarly, treatment of caves, in general, would emphasize a more proactive management approach than under current conditions.

Effects to archaeological resources and "at-risk" significant archaeological resources would generally be the same under all action alternatives. The approximately 875 acre Wagon Roads ACEC would restrict some uses within the boundaries of the ACEC. Mining of saleable materials would be permitted within one and a half miles of the ACEC but would not be allowed within its boundary to protect the integrity of location, feeling, setting, and design that contribute to the significance of the historic roads. Military tracked vehicles and OHVs would be allowed to cross the historic roads at designated places within the ACEC but would be restricted from traveling over the length of the historic roads. Woodcutting would occur outside of the 300 foot buffer on either side of the historic roads but would not be allowed within the ACEC. No motorized vehicles, mining activities, woodcutting, or shooting would be permitted along the one mile segment of the ACEC within the fence enclosure located in Township 17, Range 12, Section 1. Special recreation permits for activities that could reduce the integrity of the roads would not be granted. All other forms of recreation that do not affect the resources for which the ACEC was designated would be encouraged. Restricting the forgoing activities would reduce erosion and soil displacement and compaction to the roads and

their associated features. By restricting those activities, the potential for degradation to the historic property would be reduced and opportunities for interpretation and public education products would be increased. Similarly, completing a non Section 106 cultural resource survey along the roads would document the full extent and nature of the historic features and would provide important information to help identify how best to protect and manage the resource.

Similar to the Wagon Roads ACEC, designating the 1,050 acres around the Tumalo Canals as an ACEC, or providing guidelines for their protection in other ACEC designations, would restrict some uses. Mining of saleable materials would not occur within the ACEC boundaries. Livestock grazing and horseback riding would be allowed within the ACEC but would be restricted from entering the 335 acres where the historic canals are located. Motorized and mechanized vehicle use would be allowed on designated trails in the vicinity of the ACEC but would not be permitted within the ACEC boundaries. Dispersed camping and new discretionary rights-of-ways would be allowed on public lands outside of the ACEC but would not be allowed inside the ACEC. Restricting the forgoing activities would reduce erosion, soil compaction, vandalism, and displacement of cultural materials along the historic canals and to their associated features. By reducing those forces affecting the site, degradation would occur at a much slower rate than under existing conditions and opportunities for interpretation and public education products would be increased. Similarly, completing a non Section 106 cultural resource survey along the historic canal segment would document the full extent and nature of the feature that would provide important information about how to best protect and manage the resource.

In light of the forgoing discussion, by emphasizing a more proactive approach to managing archaeological resources and "at-risk" significant archaeological resources in Alternatives 2-7, there would be a minimal effect relative to other resource issues. In contrast to that, by limiting uses in certain areas, conducting surveys to determine the nature and extent of the resource base across the planning area, designating ACECs, and applying a criteria for identifying and prioritizing treatment for "at-risk" significant resources, Alternatives 2-7 would have an overall beneficial effect on archaeological and "at-risk" significant archaeological resources.

Indian Sacred Sites

Summary

All alternatives would continue management direction to the extent practical, permitted by law, and not clearly inconsistent with essential agency functions to accommodate access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners. In addition, each alternative would continue management direction to avoid adversely affecting the physical integrity of such sacred sites wherever possible.

Assumptions

Each alternative would comply with the various federal laws, regulations, and policies intended to protect and preserve Indian religious practices.

The agency official would be responsible for ensuring that the BLM operates within a government-to-government relationship with federally recognized tribal governments relative to sacred sites and other tribal interests prior to decisions to implement plan allocations, goals, and objectives.

Analysis of the Alternatives

Common to All Alternatives
Each alternative makes allocation or management emphasis decisions that would potentially affect Indian sacred sites. However, prior to implementation of federal undertakings, various legal authorities require federal agencies to make a reasonable and good faith effort to take into account the affect of their undertakings on Tribal interests. Given that consideration, it is expected that affects to Indian sacred sites or access to those sites by Indian religious practitioners would be kept to the minimum allowable by law.

Social and Economic

Summary

This section describes the important social and economic effects of implementing the alternatives described in Chapter 2. The alternatives primarily affect social or economic values indirectly, as a result of land use allocation or allowable use decisions that affect future uses of public lands or conditions under which uses would be allowed, or as a result of expected outcomes from reasonably foreseeable actions that would likely be taken to implement the RMP. These include land ownership classifications and regional transportation corridor allocations that affect community needs; lands available for future mineral sales or targeted for restoration or fuels treatment reductions that are potential economic contributors to local or regional economies; land ownership classifications, scenic value, and recreation emphases that affect amenity values.

The planning area is surrounded and profoundly influenced by growth and economic development in Central Oregon. The associated build-out of rural and urban lands and increase in recreational and commercial demands on BLM-administered lands is by far the most significant social and economic influence in the region. Central Oregon is a popular tourist and retirement destination, and the contributions of recreation and tourism are important contributors to most of the local economies. Although the BLM – administered lands are, for the most part, not the premier draw for the area, lands within the planning area provide an ever-growing locally important source of amenity and recreational values as well a continued base for uses such as livestock grazing, aggregate mining, transportation rights-of-way, and land sale or exchange. Public lands in the planning area are important to the communities as a part of their cultural identities and decisions about how those lands will be used in the future affect - to varying degrees - the economies of local communities and the land available for future development.

"Common to All Alternatives" represents existing management direction that would not be changed by any of the individual alternatives. An emphasis would continue to be placed on hazardous fuels reduction through prescribed burning and mechanical treatments to minimize wildland fire damage to life and property. Livestock grazing would continue with at least 72 percent of the current authorized use. The effects relating to leasable and locatable mineral development are expected to be minor owing to the low potential for development. At least 300,000 acres are available for mineral material sales under all alternatives and ODOT could save up to $1.33 million per year by utilizing public sources of mineral materials (aggregate). There are no changes to the commercial forest land allocations or the firewood permitting process, and due to adequate resource supplies, no change in the socioeconomic effects is expected. Enough lands in planning area would be designated for military use in all alternatives for the OMD to qualify for direct congressional funding and a training center upgrade; the economic benefits are expected to remain at 2002 levels. Visitor spending associated with recreation activities on BLM lands in the planning area will continue to provide economic benefits. The proliferation of user-created roads confuses the public's understanding of designated

road systems, contributes to illegal dumping and provides easier access to public lands. The obliteration of user-created roads would restrict access but would also reduce noise, dust, and illegal dumping.

Assumptions

On-going Activities
The Prineville District of the BLM and the Deschutes and Ochoco National Forests and Crooked River National Grassland have ongoing activities within the planning area. These include land exchanges, forest and fuel management activities, as well as fencing and restoration projects.

For a detailed list of those projects see Deschutes and Ochoco National Forests Website, Central Oregon Public Lands Section of Projects (Deschutes and Ochoco National Forests, 2003), which is incorporated by reference. Generally, these include plans and activities to enhance or maintain resource values on public lands managed by the Ochoco National Forest and Crooked River National Grassland and the Deschutes National Forest. For example, both the Deschutes and Ochoco National Forests have forest plans that guide land use management decisions within each forest. In conformance with those plans, each forest also has proposed or ongoing projects that include vegetation management, forest and fuel management, campground expansions, resort improvements, trail maintenance, road reconstructions, land conveyances and master plans (Deschutes and Ochoco National Forests, 2003).

Community Needs
Communities within the planning area are economically interdependent and are working to maintain individual identities. Public lands are important to maintain generally undeveloped separation between the communities, and to support uses that contribute to local, regional, and national economies.

Several local city and county comprehensive plans and planning efforts also have an influence on land uses within the planning area. These include the Redmond 2020 Comprehensive Plan (City of Redmond, 2001), the Bend Area General Plan (City of Bend, 1998), the Deschutes County Community Plan (Deschutes County, 2001), and the Crook County Natural Resource Plan (in development). The region also has several collaborative regional planning efforts underway including a Regional Problem Solving effort just beginning in Deschutes County, the Redmond Area Collaborative Planning Project, and the City of Redmond Urban Reserve Plan. The Prineville District of the BLM is one of the partners in these collaborative projects. The region's rapid pace of growth, quality of life issues, projected land use needs, and concerns about the supply of land for commercial, industrial and recreational uses are reflected in these collaborative planning projects (Central Oregon Collaborative Projects, 2003).

In the Central Oregon area, there are short-term (less than 20 years) and long-term (20 years +) demand for lands to support community infrastructure described below.

Redmond - In its analysis of Redmond Urban Growth Reserve land needs (for a period 20 to 50 years into the future), the City of Redmond projects that there would be a net land deficit of approximately 5,500 acres of available buildable lands to provide for the projected 20-year population growth. Deschutes County and the City of Redmond have also identified a need for approximately 300 acres for expansion of the Deschutes County fairgrounds to accommodate expected future uses. Lands needed to support suitable for relocation of Highway 126 outside of the runway protection zone and to relieve the potential failure of Yew Street interchange have also been identified.

La Pine – Deschutes County anticipates a need for approximately 400 acres for development of a new airport in La Pine (Coffman Associates, 2002), and approximately

750 acres for expansion of sewer system infrastructure, treatment and holding facilities near the same area. The community has also expressed desires in the past for lands to support a variety of parks and other open-space developments.

Prineville – has an interest in acquiring Barnes Butte for future park development.

Nearly all of the lands designated for possible community expansion under all alternatives are presently zoned Exclusive Farm Use (EFU) by Deschutes and Crook Counties. EFU zoning limits development that would conflict with agriculture and prevents farmland from being divided into parcels too small for commercial agriculture. Open space uses such as parks and development of open space recreation areas (including camping and recreation vehicle park facilities) are considered likely possible future land uses that would be permitted under EFU zoning. Other uses would require future zone changes.

Ecosystem Health and Diversity

There are some vegetation treatments that are reasonably anticipated under all alternatives. Although the amount of expected treatments varies by alternative, there are some common assumptions used to estimate the economic implications of these projected outputs.

The economic benefit to private property owners from BLM's fire and fuels management programs is the avoided costs that property owners would have to pay to ensure or otherwise protect themselves and their property from fire damage in the absence of BLM programs. The complexities of insurance impacts and potential for litigated compensation for negligence make it very difficult to quantify these net avoided costs. Instead, for purposes of this analysis, estimates of BLM's future annual vegetative treatment program costs were used as a representation of the economic and social benefit to the neighboring communities from these fire/fuels and other vegetative treatments. Vegetative treatments are performed to meet a variety of land management objectives, including forage improvement, habitat restoration, promoting ecosystem health and diversity, and to contribute to the social and economic needs of local communities. Most of the cost of fuel and vegetative treatment activities is in preparation and monitoring. Costs of implementing the work are relatively low, with prescribed burning costing between $10 and $40 per acre, and mechanical treatment activities costing between $30 and $100 per acre. There is assumed to be no change in the immediate future to expenditures for fire suppression and preparedness.

Land Uses

Livestock Grazing

Table 4-15 in the Livestock Grazing section of this chapter summarizes the changes in the total animal unit months (AUMs) available in the planning area for the current situation, and for each alternative. Table 4-16 (same location) shows the expected change in cow/calf sales by alternative.

The alternatives present a range of solutions for reducing conflict, some of which involve making some allotments unavailable for livestock grazing.

As described in the Livestock Grazing section of this chapter, the effects analysis is based on several assumptions (see that section for more details). The economic analysis estimates the range of effects under both full-flexibility and limited flexibility scenarios. Neither scenario represents all permittees. Actual effects will be dependent on the private business decisions made by individual permittees based on their individual circumstances.

Most Alternative 7 forage reductions would not take place unless the grazing permittee voluntarily relinquishes his/her permit. This is assumed to reduce effects on the individual permittee, though the impact on the local economy would be the same as if the closure were forced.

Authorized use was used to compare alternatives because it more accurately reflects use than does active preference. Active preference is generally the maximum available on a specific permit, while authorized use is the forage actually applied for and used. Authorized AUMs for the current situation are displayed but B/LP RMP direction is used for comparison with UDRMP alternatives. This is because the amount of vacant and unallocated AUMs in the current situation is not necessarily typical, since the BLM has deferred requests for permits for these parcels pending completion of the UDRMP. For analysis purposes, B/LP direction is assumed to more accurately reflect baseline conditions of the No Action Alternative.

The No Action Alternative (Alternative 1) assumes that demand exists for currently available but unallotted AUMs, and permits will be issued following completion of the RMP, consistent with existing management direction.

The action alternatives are compared to the No Action Alternative to display the differences in future outcomes by alternative relative to the projected outcome under continued implementation of existing management direction.

The economic analysis uses the 1998-2002 average cattle/calves inventory for Deschutes and Crook Counties (Jefferson and Klamath represent small portions of the planning area and are not included in this number), less calves inventory of about 40 percent (to be consistent with BLM, which counts each cow-calf pair as one AUM). This is 49,484 AUMs, of which the BLM current authorized use of 18,342 represents 3.09 percent. The average length of the grazing season was assumed to be three months. Historic records indicate the 1998-2002 average value of cattle and calf sales in Crook and Deschutes Counties was $25,991,000 (Oregon State University Extension Service, Oregon Agricultural Information Network, 2003, http://ludwig.arec/edu/oain/).

Minerals

BLM administers claims for the extraction of locatable minerals (such as precious metals), leasable minerals (such as oil and gas), and salable minerals (including sand and gravel or aggregate) from its lands. However, the alternatives do not substantively change any existing direction regarding these materials. Combined with the low probability of development of locatable and leasable minerals within the reasonably foreseeable future, there are expected to be no social or economic effects associated with the decisions in this plan.

As described in the Minerals section of this chapter, the primary demand for minerals in the planning area is for aggregate. The potential for mineral material development under sales and free use contracts is high within the Planning Area because of the rapidly expanding population and the corresponding demand for aggregate material. Since many of these potential sites are near rural residential areas, the potential for conflicts with residents is also high.

Initial studies by Oregon Department of Transportation (ODOT) suggest that considerable supplies of aggregate exist on BLM lands within the Planning Area. In addition, ODOT foresees considerable future demand for aggregate for new road construction and maintenance of existing roads. They have estimated an average annual demand over the next twenty years at about 135,000 cubic yards. The Oregon Department of Geology and Mineral Industries (DOGAMI) also estimates considerable non-ODOT demand for aggregate in Deschutes County over the next fifty years. According to DOGAMI, annual aggregate consumption in Deschutes County will reach

about 1,110,000 cubic yards between 2000 and 2010, and this consumption will likely increase by about 100,000 every ten years thereafter (ODOT, 1998). For the purposes of the impact analysis, BLM anticipates accommodating ODOT annual aggregate needs of 135,000 cubic yards in all alternatives. This analysis also assumes that the cost savings are "returned" to the region by additional roadway construction that ODOT would otherwise not be able to fund in the region.

Forest Products
Commercial purchasers and individual permittees currently harvest timber, juniper boughs, firewood, and other products from BLM managed lands in the Planning Area.

Timber
Commercial timber harvest contributes substantial direct regional economic benefits (jobs associated with logging and milling) and indirect benefits from secondary wood product manufacturing and timber-related industries and services. State governments also benefit directly through receipt of four percent of revenues from BLM timber sales, firewood and other special forest products collections. The state of Oregon also collects Oregon Forest Products Harvest and Privilege Tax of about $2.87 per 1000 board feet of harvest on BLM lands (based on March 2002 tax figures).

Timber harvested commercially has been one of the most valuable forest products on BLM lands. Compared to the timber available from National Forest lands in the region, the amount of timber available for harvest on BLM's managed lands in the Planning Area is quite small. In the La Pine portion of the Planning Area, BLM manages 40,134 acres of lodgepole and ponderosa pine as commercial forest, including 1,826 acres that are managed by BLM within the La Pine State Park. These commercial forests represent 2.4 percent of the total commercial forest land base in Deschutes County. In the northern portion of the Planning Area, BLM manages about 1080 acres of commercial forest – less than one percent of the commercial forests in Deschutes and Crook counties.

For the next few decades, as La Pine timber stands regenerate and grow to commercial size, BLM will emphasize timber harvests of small diameter trees (generally, 4 to 12 inches dbh [diameter at breast height]) as part of forest restoration and fuels reduction treatments.

Special Forest and Range Products
The BLM issues permits for the collection of vegetative products. These include juniper boughs used in making furniture and other items such as transplants for landscaping, Christmas trees, lichen, juniper berries, sage leaves and other miscellaneous products. With the exception of juniper boughs and firewood (discussed later), harvest of these products on BLM managed lands in the Planning Area is a minor activity. Most of the permits to harvest juniper boughs are sold to commercial operators. The boughs are used in the making of Christmas wreaths which are then sold at retail throughout the country. In the period 1996-2000 an average of 170,113 pounds of juniper boughs were sold on the BLM Prineville District – of which an estimated 75 percent came from the within the Planning Area. The 2000 and 2001 juniper bough harvests increased substantially – averaging about 640,000 pounds. Future juniper bough production from BLM lands in the region are projected to stabilize at the last three years average of about 500,000 pounds. Based on a permit price of $0.05 per pound for juniper bough harvests, the juniper bough harvests generated $25,000 in permit receipts to the federal government over the last three years of harvest, which averaged about 500,000 pounds per year (from 2000 to 2002).

About a dozen individuals currently make their living from juniper furniture production in the region. According to interviews with several of these individuals, about one third of their raw juniper was obtained from private property, one third from U.S. Forest Service land and one third from BLM land (Burleigh, personal communication,

2003). Furniture makers estimate that they typically require 10 to 12 cords of juniper annually and that about three to five percent of the trees within most old growth stands in the region are living and suitable for furniture. Furniture makers individually select the pieces they collect for their aesthetic suitability and estimate that, on average, their raw material costs represent 5 to 10 percent of the final price of their goods (Burleigh, personal communication, 2003). Hobby wood/furniture permits issued average about 10 to 12 per year. Although permits are required for the harvest of juniper from BLM land, there is evidence that these forest products are often collected illegally without permits.

Currently, most of the firewood collection from BLM land is administered through the Central Oregon Initiative Interagency Firewood Program that sells firewood permits for $10 per cord. Up to eight cords are allowed per household annually (more than enough to meet most household's annual heating and cooking needs).

Based on the current price of a cord of wood (about $110), firewood permits can provide up to $800 ([$110/cord - $10/per cord permit cost] X 8 allowed cords) in value to each household in the region that uses firewood (although there is a personal labor cost for the cutting and hauling of the wood). In addition to the economic benefits to households, sales of chainsaws and other woodcutting equipment and supplies plays some part in the local retail and service economy.

From 1992 to 2002, firewood collectors gathered about 13,000 cords of wood from BLM managed lands in the Planning Area, generating $130,000 in revenue for the federal government and about $1,300,000 of economic benefit to permit purchasers (although there were personal labor and equipment costs for the cutting and hauling of the wood and firewood costs have not always been $110 per cord).

Despite the population growth experienced in the Planning Area over this same time period, local public demand for firewood seems to be stable or slightly declining. This trend may be due to local government code restrictions on the use and installation of wood burning stoves and increased use of other heating systems in new homes.

Military

Military use of BLM managed lands in the Planning Area occurs on about 31,000 acres under all alternatives. Use of this land consists primarily of training exercises at the BIAK Training Center. The BIAK Training Center is presently classified as a Local Training Center, and as such, depends on funding and resources from another training center. The BIAK Training Center cannot qualify for direct congressional funding unless it is upgraded from a Local to an Intermediate Training Center. Upgrading requires a long-term land use agreement of at least 30 years (McCaffrey, personal communication, 2003). In 2002, the amount of spending in support of Oregon training totaled about $1,000,000 (McCaffrey, personal communication, 2003).

Amenity values

Amenity values typically mean those natural and physical characteristics of an area that contribute to people's enjoyment and appreciation of an area and/or that contribute to its appeal, aesthetic coherence, and cultural and recreational attributes. For example, a species or scenic vista has an amenity value if its existence improves our lives in some nonmaterial way, e.g., when we experience joy at sighting a hummingbird or when we enjoy walks in the forest more when we sight a lady-slipper. Hiking, fishing, hunting, bird-watching, and other pursuits for which the planning area is used have a market value as recreation, and wild species and scenic vistas contribute, as amenities, to these activities. Yet, expressing amenity values remains somewhat elusive. When dealing with an abstract concept such as amenity values in the context of assessing any change or shift in land use management, it is important to establish precisely what we mean when we refer to the planning area's amenity values. The issue categories that most closely reflect the potential for effects to amenity values are Recreation, Visual Resources, and Land Ownership.

The concept of amenity value is inherently tied to what economists call "non-use values" as well as direct use values associated with natural resources. The premise is that people place monetary values on natural resources that are independent of their present use of those resources. For example, some people may gain utility simply from knowing that the Boundary Waters Canoe Area (BWCA) is preserved even though they may never expect to visit the BWCA. Similarly, people may be willing to pay to ensure the survival of salmon, humpback whales, lynx, and marbled murrelets even though they may never expect to see one of them. Lying behind this thesis is the assumption that there is a meaningful way to define use so that values arising from use can be distinguished or separated from those that are independent of use. When discussing socioeconomic impacts, it is important to go beyond simply delineating the more or less tangible changes and link these to human values.

In the economics literature, natural resource values that are free of people's present use of the resource have been variously termed intrinsic, existence, and nonuse values. These values arise from a diversity of motivations, including, stewardship responsibility, desire to preserve for potential future use, and a desire to bequeath certain environmental attributes and resources to future generations. Today, it is widely accepted that these nonuse values in aggregate can be very important.

Estimates of the value that local residents and users place on BLM lands for amenity purposes have not been specifically quantified. Estimates of value have been derived from previous studies and surveys and trends analysis for the region. For example, we know from this work that most people today value the openness and "naturalness" offered by large areas of undeveloped lands Local realtors attest that proximity and access to BLM lands is desired by many land buyers (Korish, personal communication, 2003), generally for their scenic, recreational, or undeveloped natural land qualities, and suggest that maintenance or enhancement of these qualities would have a positive quality of life impact on local residents or users. The extent of amenity migration is another indicator which can be directly associated with people's desire for proximity to areas with high level of amenities. Several studies conducted across the U.S. have shown conclusively that rural areas are most likely to experience growth in the 1990s, as is true of the Planning Area, (McGranahan, 1999). One of the key forces behind this growth in high amenity areas has been the growth of retirement and recreation areas in rural America. The aging of the population has increased the number of people of retirement age who are now searching for places to live that have low crime rates, low costs of living, and moderate winters. The resulting growth in transfer payments to rural areas has helped to create new jobs (Hirschl and Summers, 1982; 1984).

An additional feature contributing to the growth in high amenity areas, however, was the economic expansion of the 1990s. Demand for amenities is strongly related to income. As the population becomes wealthier, they are more able to take advantage of the benefits offered in high amenity areas. One example of this income effect is the growth of seasonal homes in various regions of the U.S. (Marcouiller *et al.*, 1996). As disposable income increased during the 1980s and 1990s, second homes proliferated. Similarly, many people had more resources for outdoor recreation and for early retirement, which fueled the process of the growth of amenity areas

This analysis considers public open space provided by the numbers of acres and zoning designations considered in Land Ownership and the range of recreational opportunities provided by the recreation management emphases established by the RMP alternatives. In assessing amenity values, management practices proposed by the RMP that could change the appearance of the natural landscape were qualitatively considered, such as vegetation, fire/fuels, and mineral extraction management.

Indirect socioeconomic impacts are typically those that can be seen on employment, household income, etc. generated by the change in the demand for goods and services

required by the directly affected industries. Indirect impacts are closely related to induced economic effects which are generated by changes in consumer spending resulting from changes made to certain factors, amenity values in this instance. Although BLM lands are a contributor to the attractiveness of the Planning Area, using data currently available, it is not possible to determine exact visitor expenditure capture rates or direct expenditures, to attribute a percentage of any additional spending values to the values provided by BLM- administered lands, or to reflect measures of indirect impacts of the Resource Management Plan alternatives. .

Recreation and tourism

On average, people have less leisure time than in the past, although that does not necessarily reflect trends in areas with a high component of retirees. Trends reflect that having less time has influenced the nature of recreational use. Individuals and families are going to the parks and other public lands that are close to them with greater frequency, but with shorter duration than in the past (Oregon Parks and Recreation Department, 2003). This, taken against regional recreation trends and growth of outdoor recreation across the socioeconomic spectrum indicates that visitor recreation and demand on BLM managed lands in the Planning Area is likely to continue to increase, given regional, state, and national trends in outdoor recreation (Community Planning Workshop, 2002; Oregon Parks and Recreation Department, 2003; U.S. Department of the Interior, 2002).

To the extent possible, actual data collected during patrols of the various designated OHV recreational areas was used to derive a clear understanding of visitor use and shifting trends for both non-motorized and motorized recreational use of BLM lands. Where data specific to the planning area was not available, general trends analysis was conducted using exiting regional, state, and national information.

In Central Oregon, tourism and recreation serve as important income generators. For example, the 2001 National report (U.S. Department of the Interior, 2002), shows that participants 16 years old and older spent $769 million on wildlife-watching activities in Oregon in 2001, fishermen another $602 million, and hunters some $365 million, representing a combined total contribution of about $1.74 billion to the State's economy. While no precise figures exist for the planning area, it is clear that these activities are important within the regional context.

The area's magnificent scenery, clean environment and numerous, as well as varied, recreation locations makes the region a popular vacation destination. However, while tourism and recreation have this important regional role, the BLM lands within the Planning Area do not serve as primary tourist destinations. According to tourism personnel interviewed at the Central Oregon Visitor's Center and the Bend Visitor's Center, other recreational and tourism opportunities such as the mountains and forests in western Deschutes County serve as principal regional visitor attractions (Audette, 2003; French, 2003; Ives, 2003). The one exception to this general statement about BLM lands in the Planning Area is wintertime OHV recreation. This use of the planning area contributes substantially to the local tourism seasonal economy.

Aside from the designated and advertised OHV trail systems, currently few visitors are knowledgeable about the recreational resources within the BLM Planning Area. However, its considerable scenic and open space resources add to the region's naturalistic character. In addition, the BLM lands increase regional tourism and recreational capacity by providing recreational opportunities for local residents who would otherwise compete for use of other more popular regional recreation areas.

Recreation trends suggest that individuals participate in a range of non-motorized and motorized recreational activities in the area. The most popular activities are recreational activities such as hiking and walking, biking, nature and wildlife observation, off-road

motorized use (OHV), hunting and target shooting, camping, and horseback riding. (Community Planning Workshop, 2002 and Oregon Parks and Recreation Department, 2003). There has been a significant increase in public demand for nature study activities and for land management emphases on wildlife and natural resource protection as well as for amenities including quiet, natural places (Oregon Parks and Recreation Department, 2003). Demand for OHV use in the region has increased over the past decade (Oregon Parks and Recreation Department, 2003). Use of BLM lands to provide winter recreation opportunities, particularly for motorized recreation, when U.S. Forest Service lands are inaccessible will continue and become more prevalent National and statewide trends reflect potential increased mountain biking use in the area (Sporting Goods Manufacturing Association, 2001). Demand for community recreation facilities (group use sites, sports fields, etc.) will also continue to increase over the length of the plan implementation period

Based on information derived from the Social Values Survey, there is a need for greater separation between motorized and non-motorized user groups on BLM managed lands in the Planning Area.

Land Ownership
The direct effect of land ownership classifications (Z1, Z2, Z3, or Community Expansion) is to influence or direct future BLM land management decisions, while the indirect effects relate to the amount of open, undeveloped space that would contribute to amenity values, or the amount of land available to meet future community needs. Any future transfers of BLM lands would necessarily be contingent on numerous other factors and participants for completion (e.g. other willing participants in the transaction, adequate funding and successful site-specific environmental compliance).

Designation of lands as Z-1 has the most restrictive influence on future BLM management decisions since these lands are identified for retention, while Z-3 designations have the least restrictive influence, since these lands are classified for disposal through either sale or exchange. For community members, Z-1 designations provide the greatest assurance of specific parcels being maintained in public ownership. Lands classified as Z-2 provide moderate management flexibility since these lands may be exchanged if there are equal or better resource values to be gained. This classification assures that lands would only be exchanged of equal or greater value, but that may not provide for specific parcels to be maintained in public ownership. Designation of Community Expansion lands are a subset of Z-3 designations, but restrict disposal to local governments, which puts a strong limitation on future management flexibility, but provides communities with a strong assurance that lands would not be used for purposes inconsistent with the community needs.

The past incidence of BLM land transfers has been very limited. Local agency funding constraints have been, and are likely to remain, a major obstacle to future land transfers of BLM within the Planning Area. At the past rate of interagency transfers within the Planning Area, the land ownership of very few acres of BLM lands would be expected to change ownership in the near future. However, current and near future demand by communities or agency initiatives may affect past rates of sale or exchange.

Transportation

User-created travelways
Much of the current use of user created travel-ways within the Planning Area is by recreational users that currently have few if any alternative resources. If alternative recreational opportunities (such as designated trail systems) are developed, many of the current recreational users would likely shift their uses accordingly.

Road Maintenance
To analyze BLM's potential future road management costs under all proposed RMP alternatives, cost information was obtained from recent road condition surveys performed by the U.S. Forest Service for the neighboring Deschutes and Ochoco National Forests. The Forest Service classifies its road inventory according to maintenance level standards. These standards vary from Level 1 roads (intermittent service that are closed to vehicle traffic and require very little maintenance) to Level 5 roads that are designed and maintained for all types of traffic.

Based on comparisons between the existing BLM and U.S. Forest Service road inventories and maintenance standards, BLM's local road maintenance costs would be most comparable to Forest Service Level 2 costs and collector road maintenance costs would be comparable to Forest Service Level 3 costs. Due to lower rainfall, less-steep topography and fewer adjacent trees on BLM lands, the annual road maintenance costs for most BLM lands would be substantially lower than the U.S. Forest Service estimates.

Table 4-26 presents the estimated future annual maintenance costs for BLM roadways and also shows the equivalent U.S. Forest Service maintenance levels and costs. These cost estimates also represent the full annual maintenance costs, but in practice, the BLM, Forest Service and other agencies regularly defer annual maintenance spending.

Incomplete and Unavailable Information

This analysis focuses primarily on qualitative discussions of the alternatives rather than on quantitative comparisons and evaluation. In general, quantitatively evaluating programmatic plans such as the RMP present far greater challenges than quantitatively analyzing project-specific actions, since programmatic actions are inherently more general and unspecified than site-specific projects. Thus, in most cases the relative importance or significance of findings is difficult to predict, and should not be considered conclusive without more specific information about future implementation. Without a more complete quantitative economic analysis the available secondary data only informs our understanding of potential impacts based on general trends within the region, state, and nation.

Analysis of the Alternatives

Common to All Alternatives
The effects described in this section are derived from existing and projected socio-economic conditions that are unchanged by the decisions made for the planning area, but that influence the significance of effects

Table 4 - 26. Comparison of estimated annual road maintenance costs

USFS Maintenance Level	Estimated Annual Cost per mile for USFS roads	BLM Road Type	Estimated Annual Cost per mile for BLM roads
2	up to $1,650	Local	$900 - $1,000
3	$5,200 - $6,400	Collector	$2,000 - $2,400

Note: These annual cost estimates represent the projected funding necessary to maintain agency roads adequately so as not to generate additional deferred maintenance needs. Actual annual maintenance spending has been less than these estimated costs

Source: U.S. Forest Service and BLM District Offices (Paterno, 2002 and 2003; Collins, 2002, personal communications).

Ecosystem Health and Diversity
BLM spends approximately $1.5 million per year on its fire suppression program, not including large fire suppression costs, which are paid from other accounts. Fuels management programs are funded at about $2.4 million annually, including planning and salary costs, district support costs, and treatments including a mixture of prescribed burning and mechanical fuels reduction treatments. The fuels program is growing dramatically with the emphasis placed on reduction of hazardous fuels by the 2000 National Fire Plan.

Livestock grazing and firewood collection on agency lands also serve to reduce fuel loads, although the value of these activities to the fire and fuel management programs has not been quantified. Often there is a cost associated with administration or clean up following wood cutting, and the costs and benefits may actually cancel one another out, resulting in a break-even situation. These costs express the entire program costs over 1.6 million acres of BLM lands in Central Oregon, a much larger area than the BLM managed lands in the Planning Area.

BLM fire and fuels management programs play an important role in maintaining public safety and protecting property and ecosystem values within the region. Throughout the Planning Area, BLM lands are adjacent to local communities and private residences. As a result, wildland fires have a great potential to cross property lines between private lands and wild lands. Wildland fires risk public and firefighter safety, have the potential for property damage and ecological effects that may not be consistent with management objectives.

As part of its land stewardship responsibilities, BLM manages fuel arrangement and quantities as a preventive measure to reduce the severity of wildland fires. Also, BLM actively suppresses wildland fires to minimize fire damage to human lives and property. The Federal Fire Policy of 1995 stresses that human life is the primary priority for protection. As a secondary concern, BLM also uses fire management to minimize resource damage from wildland fires.

Land Uses

Livestock Grazing
Under all alternatives, livestock grazing would continue to be allowed in the planning area, with authorized use expected to be at least 72 percent of current authorized use, or at least 50 percent of Alternative 1 direction.

Mineral Uses

- Locatable and Leasables
  These are not discussed in detail in this section, as there is low potential for the development of these materials.

- Salable Minerals
  All alternatives make decisions about availability of lands for mineral uses and conditions under which those uses may occur, but do not authorize site-specific development. In all alternatives, there would be a minimum of about 300,000 acres available for mineral uses. The primary variables are related to specific site information such as rock quantity and quality and haul distance, which are generally not known at this scale. Use of BLM lands for future aggregate sources offer two primary benefits for ODOT. Fees for development and extraction from these sites are generally waived for ODOT and other public agencies. For commercial operators, BLM would charge $0.65 per yard of material extracted from public lands. By waiving this charge, BLM would, in effect, be transferring an equivalent economic value to the region from the cost savings. This savings may either be retained in the region

(e.g. by enabling ODOT to perform more work within the region for the same budget) or the savings could pass out of the region to benefit other areas of the state. As a conservative estimate (assuming that any cost savings are split equally between the region and state) based on ODOT's projected annual need of 135,000 cubic yards, the total potential cost savings would be nearly $88,000 a year resulting in a regional savings of about $44,000. In addition, ODOT estimates that the agency also is able to achieve major savings in its raw material costs when it can offer a material source for its aggregate needs. As its economic analysis of the aggregate industry for the Bend/Sisters/Redmond area concludes:

> (T)he predominance of high quality aggregate material sources are owned by a few private owners, which reduces competition on construction contracts, and increases overall construction costs. Developing and/or acquiring new material sources in the study area under public control would be in the public interest, as it would increase the competitiveness of aggregate pricing and decrease overall road construction costs (ODOT, 1998).

ODOT also estimated that in 1998 it saved an average of $4.40/ton of aggregate when it was able to provide a material source for a road project largely as a result of the increased competition for the contract. Adjusting for inflation and converting into cubic yards, this savings is estimated to correspond to about $3.80/cubic yard. This would represent a total potential cost savings of nearly $513,000 per year, resulting in possible regional savings of $206,000 in addition to the savings from the waived lease costs.

A second economic benefit to ODOT from using BLM mineral resources would be generated from the hauling cost savings if nearby gravel sources can be used for future road improvements. ODOT considers the availability of local aggregate sources important since the cost of aggregate typically represents over 50 percent of roadway construction costs. Hauling costs directly affect the price of aggregate – each five miles of hauling distance can add between $0.25 and $1.00 per cubic yard of material. Since the location of the future BLM aggregate sources are not known it is not possible to precisely estimate the average hauling distance that BLM pits would provide ODOT compared with the existing private sources. However, the potential aggregate pits near Cline Buttes offer a 5- to 10-mile haulage savings compared with the next alternative private resources. Based on ODOT's projected annual need of 135,000 cubic yards, an increase in the average haul distance of 7.5 miles would increase raw material costs $337,500 to $1.35 million per year. Using the mid-point of the hauling cost estimate, then $840,000 a year is a representative estimate of what the hauling cost saving might be if BLM sources are used by ODOT for its future aggregate needs.

Based on the analysis and assumptions stated above, the total economic savings is estimated to be about $1.33 million a year, which (if the cost savings are shared evenly been the state and region) would result in a cost savings of about $665,000 per year in the region. This would represent a direct positive impact to the region's economy. Note, however, these cost savings are only rough estimates, since the exact nature of cost savings and exact costs for site development and closure (siting, environmental compliance and other development and closure costs) are unknown.

Forest Products

There would be no change to the amount of lands designated commercial forest lands under any alternatives, and therefore no change to long-term projected economic benefits that could be realized from harvest of materials from those lands. There would be no changes to the current permit process for juniper or other special forest products harvest. Since none of the alternatives propose any major change to the current permit process for juniper boughs or other special forest and range product harvesting on BLM and the available resource supply is expected to be adequate for these continued land uses,

there would be no direct or indirect socioeconomic impacts as projected from future implementation of the RMP alternatives for juniper and other forest product harvesting within the Planning Area.

No changes to the current firewood permitting process are proposed under any of the RMP alternatives. Although BLM may periodically change the areas where firewood collection would be allowed, the alternative locations would not appreciably increase the cost or decrease the opportunities to gather firewood on BLM managed lands in the Planning Area. Firewood collection from dead trees would be expected to decline while firewood from small diameter green trees (thinning) would be expected to increase. Future firewood sales are projected to be below the Planning Area's sustainable yield.

Since none of the action alternatives proposed to change the current permit process for subsistence or other firewood collection on BLM lands and the available resource supply is expected to be adequate for these continued land uses, no change in socioeconomic effects are projected as a result of future implementation of the RMP alternatives.

Military Use
Common to all alternatives would be the designation of some portion of the planning area under a long-term use agreement that would enable the OMD to qualify for a training center upgrade and direct congressional funding, thus maintaining a reasonable expectation of annual revenue into the local communities similar to that experienced during 2002.

Amenity Values
Scenic values on BLM managed lands in the Planning Area would continue to be characterized by the large tracts of natural lands in the region, with dominant vegetation features including juniper and pine wooded areas, shrub lands, and grass lands. Topography and water features are other dominant natural landscape features. Wildland fires would continue to be suppressed, limiting short-term adverse visual impacts associated with burned landscapes.

Recreation and Tourism
Visitor spending associated with recreation activities on BLM lands within the Planning Area will continue to provide economic contributions to the local and regional economy. However, based on secondary data at hand it is not possible to measure the effects of directly associated visitor spending relative to BLM managed lands in the Planning Area. It is expected that given the concentration of OHV use occurring between the months of December through March that economic inputs relative to all recreational uses will be greatest during these periods. Other seasonal variations relating to recreational uses on BLM managed lands in the Planning Area can be expected; however, there is limited data to predict inputs relative to seasonal fluctuations.

Transportation

Road Maintenance: Arterial roads within the Planning Area are mostly under county or state jurisdiction and therefore not maintained by BLM. In 2002, BLM estimated its annual road maintenance budget for the Planning Area was about $26,300 and staffed by the equivalent of 0.2 full time equivalents (Leonard, 2003) for roadway-related work. This budgeted level of annual road maintenance is insufficient to meet the annual road maintenance needs for the area, and results in continuing annual deferred maintenance in all alternatives.

User-created travelways: Blocking or obliterating user-created travel-ways is an on-going activity as new, undesignated travel-ways are found. The proliferation of user-created travel-ways damages vegetation, increases soil compaction, makes it harder to understand the designated road system, provide access to problem dumping areas, and

often provide convenient access from residential areas to public lands. Generally these roads have very intermittent uses and their elimination would likely have very limited impacts. Some local residents may have convenient access to public lands eliminated, although these past uses have generally not been in compliance with BLM authorized land use policies. It is also expected that reductions in user created roads, particularly in areas near to urban areas or residential areas would reduce the potential for illegal dumping noise, dust and user conflict with those residents preferring a naturalistic setting surrounding to their homes. Since past use levels and use patterns are not known, the extent and nature of these effects on local residents cannot be precisely identified or quantified.

Alternative 1
Specifically, this alternative is the Brothers/La Pine RMP direction continued with the addition of all subsequent NEPA decisions, emergency closures, settlement agreements and current memoranda. Alternative 1 would not provide a transportation corridor south of Redmond outside of the existing urban growth boundary, resulting in potentially reduced economic development for the City of Redmond. Lands classified for Community Expansion lands would include most of the lands in demand from local communities, but not in La Pine. Alternative 1 would anticipate a vegetation and fuels program that would generate about $204,000 annually. All of the area would be open to mineral sales, which would give this the highest potential for conflict with adjacent neighbors of all alternatives. Amenity values would be represented by about 95 percent of the public lands within the planning area in a retention or retain or exchange classification and management flexibility would be the highest of the alternatives with about 44% of the planning area classified as Z-2. This alternative would also have the highest amount of lands designated for disposal, allowing for the greatest potential benefits from the BACA bill.

Community Needs
Under Alternative 1, about one percent of BLM managed lands in the Planning Area would be designated as Community Expansion areas, which are lands for disposition to other governmental ownership if these government agencies (federal, state or local) wish to acquire the properties. It is expected that the future use of at least part of the Community Expansion would include open space or recreational uses desirable to the local communities (such as group use sites, sports fields, campgrounds, recreational vehicle park facilities, target shooting areas, or other developed recreation amenities), but some future infrastructure development may also occur.

The Community Expansion areas identified under this alternative would be available for disposition to other governmental ownership if these government agencies (federal, state or local) wish to acquire the properties. It is expected that the future use of at least part of this 5,617 acres would include open space or recreational uses, but some future development may also occur.

Redmond: Under this alternative, up to 300 acres of BLM land adjoining the Deschutes County Fairgrounds would be available for possible acquisition by the County or other local agency to enable future Fairground expansion. Development of additional parking and open space recreational uses (such as development of a recreational vehicle park) are the expected future land uses for the acquired lands. This expansion of facilities would represent positive social and economic benefits to the local community and region by providing additional capacity and services to serve large events and attract visitors (Bishop, 2003). The large availability of land offered and the relatively slow rate of likely future development in the area suggests that 300 acres would be more than enough land to accommodate development within the next 20 years.

La Pine area: Under this alternative, several properties designated by the BLM as Zone 2 properties are desired by local communities (as described under assumptions) for

development. Since these properties would be designated as Zone 2, it is possible that some public entity could acquire these lands if there is evidence of sufficient community need (per the Recreation and Public Purposes Act) and a fair land exchange can be arranged.

Regional Transportation: Alternative 1 corresponds to ODOT's "No Build Analysis" in the "Yew Avenue to Deschutes Market Road Analysis' (ODOT, 2002b). Under this alternative, no BLM land would be provided to ODOT or Deschutes County for use in future transportation improvements of US 97.

US 97 is the primary north/south transportation corridor for Central Oregon, serving the rapidly growing communities of Redmond, Bend, Sunriver and La Pine. The highway also is used as a major truck route for the Western United States, providing shorter and more direct access for goods between California, the Willamette Valley, Central Oregon, eastern Washington and Northern Idaho.

Travel speeds average from 35 to 45 miles per hour (mph) for automobiles and 26 to 40 mph for trucks along the corridor. By 2016, the travel time from Madras (just north of the Planning Area) to the California-Oregon border is expected to increase from 4.4 hours to 5.8 hours, an increase of nearly 30 percent. Currently, 27 percent of the corridor is classified as moderate congestion and 5 percent is high congestion. If no improvements to the highway are made, the areas of high congestion are projected by ODOT to increase to 26 percent (ODOT, 1995).

According to the ODOT transportation analysis, the current volume to capacity ratio (v/c) for the 30th highest hour for five of the intersections associated with the Yew Street interchange are unacceptably high and do not meet state mobility standards (ODOT, 2002b). The 30th highest hour statistic is used by ODOT to represent the likely peak rush hour conditions that may be expected to occur. Traffic conditions are projected to deteriorate further by 2015 and 2025 – resulting in v/c ratios greater than 2.0 at nine local intersections. These mobility conditions can be expected to hinder further development in the neighboring areas. The congestion and delays associated with the inadequate traffic infrastructure may be expected to be a fundamental constraint to any new commercial, industrial or residential development on properties needing to use these connections to access US 97.

As a result, unless the Yew Street interchange and transportation system receive adequate improvements, it is expected that any development adding significant levels of traffic in that area would prove difficult to permit. This presents potential adverse consequences to the City of Redmond since this constraint could prevent:

- Planned future expansion of the current transportation system;
- Expansion of the County Fairgrounds; and
- Continued economic development at the existing Airport Business Campus Industrial Park (ABC Industrial Park) and future development of the planned Roberts Field Business Center (Roberts Center).

In addition, several other potential local development projects could be affected by continued "failure" of the Yew Street interchange. These include: planned expansion of the Central Oregon Community College, the planned Franks Landing commercial center at the Yew Avenue Interchange, the 200 acre Central Oregon Irrigation District office park development, and future development of 80 to 100 acres of City of Redmond property zoned for industrial use located south of Airport Avenue and west of 19th Street.

At this time, most of the projects mentioned above have insufficient information to assess economics associated with their development. However, the ABC Industrial Park and the Roberts Center have had studies done to assess potential changes to the region's

economy. If completed, the ABC Industrial Park and the Roberts Center together could add between 1,600 to 4,750 jobs and $42 to $179 million in wages to the region. Similarly, the development of those two projects could generation up to $12 million in enhanced property value and taxable property base for the City and County. In addition, full construction of those two projects could generate one-time construction spending of over $183 million for the region. Under Alternative 1, the region would not realize such benefits. It should be noted, however, that total economic development estimates presented for ABC Industrial Park and the Roberts Center are highly dependent on numerous other factors such as future commercial real estate demand, other economic conditions and related regional development. However, for purposes of this analysis these projections serve as a relative means of comparing alternatives.

Ecosystem Health and Diversity

Alternative 1 represents BLM's current fire/fuels and vegetative management practices and operational budget. All other alternatives are then compared to Alternative 1 to determine potential changes under the proposed RMP alternatives. BLM provided no cost estimates for treatment planning activities (which would be mainly an internal-to-BLM expense). The following analysis is based on the cost of implementing the treatments. Current treatments on BLM managed lands in the Planning Area are estimated to be about 4733 acres annually. Of these 4733 acres, about 2580 acres are estimated to be prescribed fire treatment and about 2,000 are estimated to be mechanical treatment.

At an average cost of $65 per acre, the cost for mechanical treatment of 2150acres is estimated at $139,750. At an average cost of $25 per acre, the cost for prescribed fire treatment is estimated at $64,500, for a total program cost of $204,250 annually under Alternative 1.

Land Uses

Livestock Grazing

Alternative 1 is the baseline to which other alternatives are compared. Note that Alternative 1, the No Action Alternative, is not the same as the current situation.

Under Alternative 1, livestock grazing would continue on 388,823 acres, with 25,816 AUMs. No permittees would be affected by AUM reductions. In this alternative, BLM-administered forage would provide for just over four percent of local cow/calf sales.

Alternative 1 represents an estimated increase of 7,474 AUMs authorized use from the current situation, and a corresponding increase in livestock sales of 1.26 to 5.03 percent. Estimated sales of cattle and calves under Alternative 1 direction would increase by $327,000 to $1,308,549 from the current situation. This would increase the size of the livestock industry within the planning area, especially in the La Pine area where the unalloted areas are located.

Mining

Under Alternative 1, BLM has about 402,400 acres or 100 percent of BLM managed lands in the Planning Area open to locatable mineral entry. Similarly, BLM has about 372,850 acres or about 93 percent of BLM managed lands in the Planning Area open to mineral leasing, of which about 21,250 acres are barred from surface occupancy.

Alternative 1 would continue to have about 402,400 acres or 100 percent of BLM-administered lands in the planning area open to mineral sales.

IMPLAN Sector 51 – New Highways and Street multiplier has been used to estimate the potential for direct employment benefits to the region from the increased construction spending "funded" by the road construction raw material cost savings. The IMPLAN

employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates about 9.1 jobs. Therefore, an increase of $665,000 in highway construction would generate about six jobs for the region annually.

The indirect socioeconomic effects associated with ODOT use of BLM mineral resources for its aggregate needs can be estimated using the IMPLAN input-output model. The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates about 8.5 indirect (and/or induced) jobs. Therefore, the estimated increase of $665,000 in highway construction spending would generate about 5.6 indirect jobs for the region annually.

The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates $0.6 million indirect (and/or induced) output spending. Therefore, the estimated increase of $665,000 in highway construction spending would generate about $0.4 million in indirect output for the region annually.

Forest Products

Under this alternative, the average annual timber harvest on BLM managed lands in the Planning Area would be about 50,000 cubic feet or 250,000 board feet. About half of this annual timber harvest would be for sawlogs, posts and poles, with an estimated sales value of about $300 per 1,000 board feet. The remaining timber would be harvested for wood chips, with an estimated value of $16 per green ton. The estimated commercial value of the harvestable sawlogs (not necessarily BLM revenue returning directly to BLM) would be $37,500 and the wood chips would be about $16,000 (1,000 tons). The total commercial value of timber production under this alternative would be about $53,500.

Based on this production estimate, and assuming all revenue comes from salvage or restoration sales, the federal government would retain about 96 percent of this revenue ($51,360) and the remaining four percent would be allocated to the state and likely returned to the county in which the timber was harvested.

Amenity Values

With respect to open space values, BLM would continue to classify about 95 percent of its lands within the Planning Area with the zoning designations Zone 1 and Zone 2. Under these zoning designations, BLM would continue to retain the lands in public ownership with an emphasis on increasing public land holdings (i.e., Zone 1) and would continue to identify these areas as lands with high resource values (i.e., Zone 2). Lands on the periphery of large blocks would continue to be fragmented and somewhat discontinuous on the periphery of BLM's holdings, which would somewhat detract from the open space values associated with natural space and opportunities for solitude.

Based on information derived from the Social Values Survey, there is a desire for greater separation between motorized and non-motorized user groups on BLM managed lands in the Planning Area. While opportunities for mixed uses would remain the same under Alternative 1, the character of the natural areas and the quality of the experience would continue to be affected and in some cases dominated by motorized uses, thus potentially adversely affecting desiring a more natural experience.

Under Alternative 1, the application of recreation management emphases (for definitions of recreation management emphases, see the following Recreation discussion) would continue to provide a range of recreation opportunities, although mostly shared use facilities. Nearly 80 percent of BLM lands in the Planning Area would be managed with a multiple use with shared facilities emphasis and nearly 20 percent would be managed with a roads only/low recreation emphasis, providing very little separation between motorized and non-motorized uses.

Due to these considerations, amenity values under Alternative 1 would continue to be beneficial contributors to the quality of life in the region, but are not optimized due to parcelization of open space and a limited range of segregated recreational opportunities.

Existing vegetation management practices would continue under Alternative 1, under current visual classifications. Alternative 1 provides less emphasis on the scenic importance of dominant community background features. However, to most people the difference in emphasis is not noticeable. About 402,400 acres within the Planning Area would be open to mineral sales, potentially resulting in adverse visual impacts associated with surface mining activities (e.g., large-scale vegetation clearing, topographic modifications, erosion, etc.), although the likelihood of wide-scale landscape disturbance is low. Overall scenic values under Alternative 1 would continue to have moderate beneficial effects on the quality of life in the region.

Under the Alternative 1, visitors would continue to be unaware of the recreational resources on BLM managed lands in the Planning Area, and recreational opportunities and amenities (e.g., designated trails systems, signage, parking lots, outhouses, and interpretive areas) would continue to be limited. The potential development of recreational amenities for local communities in Community Expansion areas would have a positive effect on visitor enjoyment of recreational resources in the planning area.

Transportation

Local Transportation System: Alternative 1 represents the amount of total road miles currently inventoried in the BLM data base. In total, there are about 3, 281 miles (2,562 miles of local roads, 302 miles of collector roads, 199 miles of historic roads, and 218 miles of arterial roads) of roads that meet definitions of local, collector, or arterial roads as defined in the Glossary.

Common to Alternatives 2-7
Within the limits of available information, this social and economic analysis suggests that, because of the nature of the decisions, for most resource areas Alternatives 2-7 would have negligible adverse or beneficial effects on the region's social and economic environments. The exception to this would be the projected indirect economic benefits derived from restoration and fuels reduction activities, from projected economic development associated with the transportation corridor south of Redmond, and from the expected cost savings to ODOT from areas available for mineral extraction.

Alternatives 2-7 would provide some designated transportation corridor to help to meet identified community needs within the planning area. The potential future effect would be to allow for at least build-out within the City of Redmond's Urban Growth Boundary, although the degree to which the corridor would alleviate current problems varies by alternative.

For Alternatives 2-7, the combined total quantifiable spending and employment changes from timber and vegetative management changes would be less than a $0.5 million and fewer than 12 jobs. Compared with a regional economy for the agricultural sector of $143.7 million in annual output and 3,906 jobs, the projected changes in spending or employment for timber and vegetation management would be less than a 0.35 percent increase in the region's agricultural industry and 0.3 percent increase in regional agricultural jobs. In a regional context, therefore, this increase would be barely discernable and would be considered only of minor importance to the area's agricultural sector. The increase would have no discernable national importance.

Livestock grazing would continue on 228,685 to 388,271 acres, with 13,286 to 25,747 AUMs. One to fifty permittees would be affected by AUM reductions, and there would be a 0.01 to 8.44 percent reduction in local cow/calf sales.

The exact importance of the social and economic findings associated with mining and minerals cannot be stated without additional analysis. However, for saleable minerals, while the magnitude of the full cost savings loss is indeterminate, if the full savings of $665,000 and six jobs were lost from the construction sector, this would represent an adverse impact, decreasing regional construction spending and jobs by about 0.06 percent. In the context of the Planning Area, its vicinity, and the region in general, this small decrease would likely have little significance on the local economy. This decrease would have no discernable national importance.

Under Alternatives 2-7, surface occupancy restrictions would increase under each action alternatives from about 52,810 acres under Alternative 2 to about 101,350 acres under Alternative 5. However, the potential for locatable or leasable mineral development is low, and it is unknown whether the location of the surface occupancy restrictions would affect any future mineral leasing activities.

Future reconfiguration of the transportation system on BLM managed lands within the planning area is intended to meet recreational and travel management objectives, maintain adequate user access, and reduce BLM's land management costs (e.g., by reducing route mileage, dumping opportunities and law enforcement requirements).

Alternatives 2-7 would all include direction for subsequent area analyses to determine whether local roads would become part of the designated system, or be available for closure. In general, future direction would likely be to close redundant roads and develop more loop routes in an effort to decrease user-created road formation and use. Although exact effects cannot be predicted until a site-specific analysis determines which local roads would be designated or closed, based on other management direction, those areas with primary or secondary wildlife emphasis are likely to have the greatest potential for road reduction. (See also Chapter 4 - Transportation and Utilities) Closure of frequently traveled local created roads may affect users who relied on these routes as access to specific locations for recreational or other activities within the Planning Area. Removal of these access routes would likely increase their travel time to the location if they can take alternate routes to access these locations.

No economic benefits to the local economy were identified due to the disparity between the current road maintenance expenditures and the projected cost for future maintenance and the uncertainty over the exact road miles to be maintained under each alternative. Given the current deferred road maintenance needs, it is difficult to determine the additional effects any changes in responsibilities would have — either for road closure or for road maintenance. Considering both context and intensity, the effects from internal road changes do not appear to be of major importance regionally or nationally. However, the internal road changes could have substantial importance to the local BLM district in determining budgets and establishing funding priorities. Road maintenance funds are not projected to increase, and therefore, a continuation of deferred annual maintenance would occur in Alternatives 2-7. In future, the anticipated reduced amount of local roads would also reduce the amount of deferred maintenance. However, until a final site-specific analysis has been completed, there is no way to estimate the degree to which that might be reduced.

Individual Alternatives

The effects of transportation corridors transportation and access impacts associated with the RMP alternatives on regional transportation vary. However, Alternatives 3 - 7 would provide for a transportation corridor allocation that could potentially provide for major transportation improvements to solve existing interchange problems. The potential related economic development that could be realized by the interchange improvements was estimated at $42 to $179 million in annual wages and 1,600 to 4,750 jobs. While such economic development is dependant on numerous other factors, even the lower level of job increase would result in nearly a 2 percent increase in regional

employment. This would represent a major economic benefit in the Planning Area, its vicinity, and regionally. Accordingly, the benefits associated with Alternatives 3 through 7 could have substantial regional importance and significance. Nationally, however, the transportation-related land use changes proposed under Alternatives 3 through 7 would have little importance.

These alternatives all have potential major socioeconomic benefits for the region from improvements to the regional transportation compared to the No Change Alternative. It is conservatively estimated that 1,600 jobs and $42 million in additional wage income could be dependant on the development of a South Redmond — Deschutes Market interchange solution to the regional transportation problems at Yew Avenue. While this economic development will also be dependant on numerous other factors, the transportation corridor provided under these alternatives would be a key land resource necessary for the South Redmond — Deschutes Market interchange. Therefore, it is projected that these alternatives would have substantial potential direct and indirect socioeconomic benefits for the region from new jobs and spending generated by the potential economic development.

For Alternatives 2, 4, and 5, there would be an expected indirect effect resulting from future vegetation restoration and WUI treatments representing an estimated net increase in management spending of about $107,500, which would generate about three jobs. An estimated $68,800 in additional indirect spending and one job would be generated by these alternatives

For Alternatives 3, 6, and 7 there would be an expected indirect effect resulting from future vegetation restoration and WUI treatments representing an expected net increase in management spending of up to $342,000, which would generate about nine jobs. An estimated $218,880 of additional indirect spending and up to 3.3 jobs would be generated by these alternatives. This is a beneficial but small local economic impact.

The effects of the alternatives vary by the amount and location of acres available for mineral material sale (see Chapter 4 Land Uses – Minerals), and by the potential for cost savings to ODOT. This potential cost savings is likely to be realized under most of these alternatives. However, under Alternative 4, ODOT may not realize that cost savings due to requirements to use alternative existing aggregate sources before developing comparable sources on public lands. The added costs would represent "lost" cost savings to ODOT compared to the savings ODOT achieves under Alternative 1 and 2. The lost ODOT savings could have adverse indirect effects on jobs and spending in the region, although how that might be offset by jobs and spending by private companies has not been examined in detail. For Alternatives 3, 6, and 7 the estimated cost savings would likely be realized, but could be somewhat reduced compared to that in Alternative 2 because of some potential additional development or operational costs related to SMA restrictions.

For Alternatives 2, 4, and 5, about $75,000 in increased timber production would occur compared to Alternative 1, which would generate about 2 jobs for the region. This represents a small but beneficial impact. No socioeconomic impacts are expected since adequate resources are expected to be available and no changes to the permit process are proposed. An estimated $48,000 of additional indirect spending and up to one job would be generated under each alternative. This represents a small but positive local economic benefit. For Alternatives 3, 6, and 7 increased projected timber production that would occur under these alternatives would generate two to three more jobs for the region and about $107,000 in spending. While these increases in employment and spending are not large, it is beneficial to the region. About $68,000 of additional indirect spending and up to one job would be generated by these Alternatives.

There is little difference between the alternatives regarding open space. Alternatives 2-7 all include most of the planning area in a "retention" classification (Z-1 or Z-2). Alternatives 3, 4, 5 and 6 all have requirements for maintenance of open space characteristics on lands classified for Community Expansion. There would be substantial positive socioeconomic effects from maintaining large blocks of land with known resource values and preserving the greenbelts separating the Bend and Redmond communities. However, there may also be potential lost economic opportunities if those lands do not meet community needs for industrial or other identified development needs.

The potential effects that could reduce amenity values related to development of mining sites are discussed in the Land Uses – Minerals section of this chapter. Overall scenic values would be potentially most affected by these uses in Alternative 2, and would have the least potential to affect amenity values in Alternative 3. Alternatives 4 and 5 would also have reduced potential over Alternative 1 due to requirements for utilizing alternative sources and buffer zones around residential areas. Alternatives 3, 6, and 7 have the most aggressive probable vegetation treatments and can therefore be expected to have the greatest potential short-term effects on scenic quality, but would likely have similar long-term effects which would generally support continued naturalistic settings.

There are positive indirect socioeconomic impacts associated with these alternatives due to the perceived link between property values and proximity to open space and public lands. Recreational spending is expected to increase as a result of improved recreational opportunities. This is a beneficial local impact. These alternatives would have indirect benefits because they would increase the need for local goods and services to support more identifiable recreational opportunities and greater diversity than Alternative 1. Indirect benefits associated with these changes in recreational opportunities also would include increased opportunities for interpretation and education in the area.

Community Needs

Regional Transportation Corridors

Alternative 2: This alternative would allocate a transportation corridor to facilitate future granting of a right-of-way for a road south of Redmond to the Deschutes Market interchange. This alternative would not include a potential interchange link at Quarry Road.

ODOT's analysis of this alternative concluded that this road configuration would not remove sufficient traffic from the Yew Avenue Interchange to enable the future interchange to meet mobility standards (ODOT, 2002b). While the proposed improvement of the interchange and extension of the roadway to the Deschutes Market interchange would reduce some of the congestion and traffic impacts at the Yew Interchange, ODOT indicates that these improvements would be inadequate to solve the congestion problems described under Alternative 1. Thus, this Alternative offers little change from Alternative 1. Under Alternative 2 none of the area's potential economic development dependent on the Yew Avenue Interchange improvements would likely occur.

Thus, as in Alternative 1, the region would not realize the benefits associated with jobs, wages, enhanced property values, increased tax bases, or construction spending (see also Appendix A) Under this alternative, the estimated future economic benefits potentially associated with development of properties such as the ABC Industrial and Roberts Field Business Parks would possibly be partially obtained, thus representing some potential economic benefits; however, the degree to which future development would be limited under this alternative has not been quantified.

Alternative 3: Alternative 3 would allocate a transportation corridor to facilitate redevelopment of the Yew Avenue interchange and development of a roadway corridor about 2 miles south of Redmond to a proposed interchange at the junction of Quarry Roadnue and US 97. The proposed roadway corridor would consist of an extension access between South Redmond and the two interchanges. Under this alternative, land use measures would also be applied to control any development on the land adjoining the roadway corridor to prevent any future sprawl impacts.

ODOT's analysis indicates that the proposed regional transportation and access changes under Alternative 3 would significantly improve the area's current and projected future traffic problems (ODOT, 2002b). Under this alternative, the 2025 volume to capacity (v/c) ratios for the segments of US 97 south of Yew Avenue and North of Quarry Roadnue would be improved over the existing roadway — with v/c ratios decreasing by 0.04 to 0.06.

Under this alternative future economic development projects such as the ABC Industrial Park and the Roberts Center could be completed. If completed, the ABC Industrial Park and the Roberts Center together could add between 1,600 to 4,750 jobs and $42 to $179 million in wages to the region. Similarly, the development of those two projects could generation more than $12 million in enhanced property value and taxable property base for the City and County. In addition, full construction of those two projects could generate one-time construction spending of up to $183 million for the region. Under Alternative 3, assuming development of these projects or similar ones, the region would realize benefits that it would not realize under either Alternatives 1 or 2. Even if only some of the development associated with these projects occurred, the area would still realize substantial benefits to the regional economy. These economic benefits represent potential direct benefits to the economy.

Secondary benefits would be generated from the related spending in the regional economy by the employees and other businesses serving the firms in projects such as the industrial and business parks described above. The magnitude of these indirect impacts can be estimated using an IMPLAN input-output model for the affected region.

According to the IMPLAN model for the two county region, in the Trade sector about $0.7 million of indirect spending is generated for every $1 million of direct spending in the region. In addition, about 9.5 indirect jobs are also associated with every $1 million of direct spending. Therefore, as a conservative estimate of the economic impact based on an estimated total direct economic development impact of $42 million, about 400 associated jobs and $29.4 million of indirect economic benefits could be expected

Alternatives 4 – 7: Under all of these alternatives, BLM would provide a transportation corridor allocation to facilitate the redevelopment of the Yew Avenue interchange and development of a future roadway to both the Deschutes Market interchange and Quarry Roadnue interchanges. The proposed roadway corridor would consist of an extension access between South Redmond and the two interchanges. Under this alternative, land use measures would also exist to control any development on the land adjoining the roadway corridor to prevent future sprawl along the corridor. The future transportation changes proposed for Alternatives 4, 5, 6, and 7 correspond with the ODOT's Alternative 3 as described in the *Yew Avenue to Deschutes Market Road Analysis* (ODOT, 2002b).

Under this alternative, traffic levels at the Yew Interchange would be reduced to acceptable levels by providing an additional transportation corridor for traffic between South Redmond and the Deschutes Market Junction. According to ODOT, future volume to capacity ratios south of the Yew interchange would be sufficiently improved under this alternative. In addition, under this alternative, the 2025 volume to capacity (v/c) ratios for most segments of US 97 south of Yew Avenue would be improved over the existing roadway – with v/c ratios decreasing by 0.01 to 0.06. Only at the segment of US 97 South

of 61st Street would this alternative worsen the volume to capacity ratio, and in that case the increases would be minor (only a 0.01 v/c increase northbound and 0.03 increase southbound). Under Alternatives 4 through 7, the region would realize the same direct and indirect economic benefits as those described under Alternative 3

Community Expansion lands
Alternative 2 would increase the acreage classified for community expansion compared to Alternative 1, which would facilitate transfer to state or local governments interested in acquiring these lands to meet their community needs.

Under this alternative, about 750 acres in the La Pine area would be classified as available for purchase by the Deschutes County and/or La Pine Special Sewer District for the purposes of sewage infrastructure expansion to serve future community and residential growth in the area. The new sewage facilities would enable the potential development of 1,800 homes in the area. In addition, about 300 – 400 acres near La Pine (currently identified as the site for potential future development of the La Pine Airport) and currently identified for expansion of 300 – 400 acres near Redmond (for the expansion of the County Fairgrounds) would be designated as Community Expansion lands. While all of these lands were also available for possible community use under Alternative 1, they could only have been obtained through land exchange agreements. Under this alternative, these lands have been identified as Community Expansion lands and, as such, can potentially be purchased from the BLM by appropriate agencies (and pending necessary compliance and agency approval), which may facilitate their future transfer.

While this economic development would be expected to have a positive effect on the local economy by providing more housing, infrastructure and other local development for the region, the social effects may differ on the local community and region. The expansion of the housing in La Pine could change the local social environment from the influx of new residents. However, any of these developments would also be possible under Alternative 1.

Alternative 3 would result in a net decrease of nearly 2,500 community expansion acres being available for disposition to other governments compared to Alternative 1. The reduced acreage available for potential community development would reduce the future options for state or local governments to meet their community needs since fewer BLM lands would be available for acquisition. Under this Alternative, there would be specific requirements that all of the 3,120 acres designated for community expansion be used for open spaces, greenbelts and parks. There would be lost economic development opportunities for the region since these lands would no longer be available to meet community expansion needs. The magnitude of the economic development impacts would be dependant upon the availability of alternative sites and opportunities to meet the community expansion needs. In addition to the possible loss of indirect economic development effects, the indirect social impacts associated with the airport and fairground expansion would also be “lost”.

Alternative 4 would classify lands for Community Expansion that could potentially accommodate sufficient lands for the La Pine Airport, the La Pine Sewage Treatment expansion and the 300 acres for the Deschutes County Fairgrounds would be available under the Community Expansion land allocation. Since the La Pine Airport development or La Pine Sewage Treatment expansion were identified as Z-2 lands under Alternative 1, their designation as Community Expansion lands under Alternative 4 represents potential positive social and economic impacts to the local area and region by facilitating their potential future transfer.

While it is anticipated that nearly all of the likely future Community Expansion lands would be maintained as open space (possibly with some increased recreation use), other land uses could occur if rezoning of the properties is completed by the appropriate

agencies. The only currently anticipated rezoning of Community Expansion lands would be associated with that the 40 acres needed for construction of the proposed La Pine Airport south facilities (Coffman Associates, 2002). Therefore, the current amenity values for these properties are expected to be maintained and no discernable adverse social environment impacts would be expected with the community expansion associated with this alternative. The condition that interconnecting open space would be an element of the future land planning under this alternative may be expected to add some unquantifiable positive indirect social effects and likely generate additional wildlife and other ecosystem benefits.

Alternative 5 would result in a net increase of about 159 acres in Community Expansion lands compared with the No Change Alternative becoming available for future transfer to county and/or city ownership if these government agencies wish to acquire the specific properties.

Under this alternative, BLM lands for both the La Pine Airport and La Pine Sewage Treatment expansion would not be available under the Community Expansion land allocation. The properties needed for these developments would be designated as Zone 1 lands and, therefore, would not be available for these uses. If no comparable and alternative land resources are available, then compared with Alternative 1 (which designated the properties as Zone 2 lands and potentially available to meet public needs), Alternative 5 would effectively preclude future development of the La Pine Airport and/or the La Pine Sewage System. This would likely represent some adverse indirect economic impact on the regional economy although the magnitude of the effect cannot be quantified. There would also be potential indirect social effects associated with these proposed developments that would also be "lost" from this precluded development on BLM lands in La Pine.

Under this alternative up to 300 acres of BLM would be available for future expansion of the Deschutes County Fairgrounds.

Alternative 6 would decrease lands classified as Community Expansion lands under this alternative by about 500 acres compared to Alternative 1, resulting in a net reduction of potentially "saleable" BLM lands (i.e. Z-3 and Community Expansion lands) of about 2,100 acres.

Under this alternative, BLM lands for the La Pine Airport, the La Pine Sewage Treatment expansion and the 300 acres for the Deschutes County Fairgrounds would be available under the Community Expansion land allocation. Since the La Pine Airport development or La Pine Sewage Treatment expansion were identified as Z-2 lands under Alternative 1, their designation as Community Expansion lands under Alternative 6 represents potential positive social and economic impacts to the local area and region by facilitating their potential future transfer.

Under this alternative, all of the likely future Community Expansion lands would be maintained as open space (possibly with some increased recreation use) and could be used only for parks, greenbelts, open space, recreational spaces or community infrastructure needs. Therefore, the current amenity values for these properties are expected to be maintained and no discernable adverse social environment impacts would be expected with the community expansion associated with this alternative. The condition that interconnecting open space would be an element of the future land planning under this alternative may be expected to add some unquantifiable positive indirect social effects and likely generate additional wildlife and other ecosystem benefits.

Two hundred (200) acres of BLM lands desired for the future expansion of the Deschutes County Fairgrounds would be designated as community expansion under

this alternative, as compared to 300 acres under Alternative 1. Facilitation of this development could result in indirect beneficial economy impacts to the regional economy.

Under Alternative 7, Community Expansion areas would decrease by 735 acres compared to Alternative 1. The potential development of recreational amenities for local communities on Community Expansion areas would have a negligible adverse effect on visitor enjoyment of recreational resources in the Planning Area compared to Alternative 1. Alternative 7 would not include requirements for open space or greenbelts, and would meet community needs for lands for future airport and industrial development as well as fairground expansion.

Ecosystem Health and Diversity

Under Alternatives 2, 4, and 5, BLM would increase the annual mechanical acres treated (from 2,150 acres under Alternative 1) to about 7,297 acres. At an average of $65 per acre, this increase of 5,147 acres would increase program spending by about $334,555 for mechanical treatment. Total prescribed fire treatment acres would increase slightly over Alternative 1 (from 2,580 acres to 3,924 acres), for an approximate increase of $33,600 (1,344 acres X $25/acre). Total overall vegetative management program costs would increase by about $368,155 compared to Alternative 1.

Alternatives 2, 4 and 5 would result in a net increase of about $368,155 in spending on vegetative management over current spending under Alternative 1. The IMPLAN Sector 26 – Agricultural, Forestry and Fishery Services most closely matches these treatment activities and therefore has been used to estimate the direct employment effects of the increased treatment spending. The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates 25.4 jobs. Therefore, an increase of $368,155 in vegetative management would generate about 9.4 jobs for the region annually.

The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates 9.7 indirect (and/or induced) jobs. Therefore, an increase of $368,155 in vegetation management spending would generate about 3.6 indirect jobs for the region annually.

The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates $0.64 million in direct (and/or induced) output spending. Therefore, an estimated increase of $368,155in spending would generate about $235,619 in indirect output for the region annually.

Under Alternatives 3, 6, and 7, BLM would increase the annual mechanical acres treated (from 2,000 acres under Alternative 1) to 5,581 acres. At an average of $65 per acre, this increase in 3,581 acres would increase program spending by about $232,765 for mechanical treatment. Total prescribed fire treatment acres would more than double over Alternative 1 (increasing from 4,000 to 8,371 acres), for an approximate increase in spending of $109,275 (base on an average $25 per acre cost). Total overall vegetative management program costs would increase by about $342,040 compared to Alternative 1.

Alternatives 3, 6 and 7 would result in a net increase of about $342,000 in spending on vegetative management over current spending under Alternative 1. The IMPLAN Sector 26 – Agricultural, Forestry and Fishery Services most closely matches these management treatment program activities and therefore has been used to estimate the direct employment effects of the increased treatment spending. The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates 25.4 jobs. Therefore, an increase of $342,000 in vegetative management spending would generate about 8.7 jobs for the region annually.

The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates 9.7 indirect (and/or induced) jobs. Therefore, the estimated increase of $342,000 in vegetative management spending would generate about 3.3 indirect jobs for the region annually. The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates $0.64 million indirect (and/or induced) output spending. Therefore, the estimated increase of $342,000 in vegetative management spending would generate about $218,880 in indirect output for the region annually.

Land Uses

Livestock Grazing

In Alternative 2, livestock grazing would continue on 388,271 acres, with 25,747 AUMs. One permittee would be affected by AUM reductions. The effect on local livestock sales would be minimal, a 0.01 to 0.05 percent reduction, depending on permittee flexibility in securing alternate forage sources. An estimated $3,000 to $12,000 in livestock sales would be lost compared to Alternative 1. This reduction is minimal and is unlikely to have measurable effects on the local economy. In this alternative, BLM-administered forage would provide for just over four percent of local cow/calf sales.

In Alternative 3, livestock grazing would continue on 388,271 acres, with 25,747 AUMs. One permittee would be affected by AUM reductions. The effect on local livestock sales would be minimal, a 0.01 to 0.05 percent reduction, depending on permittee flexibility in securing alternate forage sources. An estimated $3,000 to $12,000 in livestock sales would be lost compared to Alternative 1. This reduction is minimal and is unlikely to have measurable effects on the local economy. In this alternative, BLM-administered forage would provide for just over four percent of local cow/calf sales.

In Alternative 4, livestock grazing would continue on 348,394 acres, with 23,471 AUMs. About 20 permittees would lose their BLM permits and need to find alternate forage, or reduce their herds. The effect on local livestock sales would be limited, a 0.039 to 1.58 percent reduction depending on permittee flexibility in securing alternate forage sources. An estimated $108,000 to $416,000 in livestock sales would be lost compared to Alternative 1. This reduction would impact the livestock industry but is likely to have minimal effects on the local economy. In this alternative, BLM-administered forage would provide for just less than four percent of local cow/calf sales.

In Alternative 5, livestock grazing would continue on 228,685 acres, with 13,286 AUMs. About 50 permittees would lose their BLM permits and need to find alternate forage, or reduce their herds. There would be a 2.11 to 8.44 percent reduction in local cow/calf sales, representing an estimated reduction of $576000 to $2,221,000 in livestock compared to Alternative 1. This reduction would affect the livestock industry and is likely to have measurable effects on the local economy, though the induced impacts were not quantified. In this alternative, BLM-administered forage would provide for about 2 percent of local cow/calf sales.

In Alternative 6, livestock grazing would continue on 347,522 acres, with 24,308 AUMs. About eight permittees would lose their BLM permits and need to find alternate forage, or reduce their herds. The effect on local livestock sales would be minimal, a 0.25 to 1.02 percent reduction depending on permittee flexibility in securing alternate forage sources. An estimated $69,000 to $267,000 in livestock sales would be lost compared to Alternative 1. This reduction would impact the livestock industry but is likely to have minimal effects on the local economy. In this alternative, BLM-administered forage would provide for about four percent of local cow/calf sales.

In Alternative 7, livestock grazing would continue on at least 279,321 acres, with at least 21,310 AUMs. Only one permittee would be affected by mandatory AUM reductions.

The remaining AUM reductions would be accomplished through voluntary permit relinquishments.

The effect on local livestock sales would be minimal, a 0.76 to 3.04 percent reduction depending on permittee flexibility in securing alternate forage sources. An estimated $207,000 to $799,000 in livestock sales would be lost compared to Alternative 1. This reduction would impact the livestock industry and is likely to have measurable effects on the local economy, but these induced impacts were not quantified. In this alternative, BLM-administered forage would provide for 3.6 percent of local cow/calf sales. Creating RFAs would increase permittee flexibility to withstand short-term AUM reductions. Requiring voluntary relinquishment for most allotment closures means effects of AUM reductions on individual permittees would be more manageable, because the permittee can choose when (or if) to relinquish his/her permit.

Minerals

Of all action alternatives, Alternative 2 would result in the largest amount of acreage open to mineral sales with about 342,000 acres available to saleable mineral mining. This represents a reduction of about 15 percent compared to Alternative 1.

Alternative 2 offers the greatest potential for mineral sales with the least amount of restrictions of any of the action alternatives and therefore, the greatest likelihood the cost saving benefits for ODOT identified under Assumptions Common to 2-7 would continue to be obtained. Compared to Alternative 1, there would be no net change in the socioeconomic effects since it is expected that under this alternative the same cost saving benefits estimated for the region under Alternative 1 would till be obtainable under Alternative 2. This alternative offers the greatest likelihood that the indirect socioeconomic effects identified under Alternative 1 would continue to occur.

Alternatives 3 and 6 would have about 340,000 acres open to mineral sales, while Alternative 7 would have about 342,000 acres open to mineral sales. This represents a reduction of 16 percent in the available area compared to Alternative 1. While the areas open to mining under these alternatives are nearly the same as under Alternative 2, under these alternatives there could be additional operating requirements or restrictions on future mineral extraction if the sites are located within the Juniper Woodlands or Peck's Milkvetch ACEC. Alternative 7 would modify the boundary of the Peck's Milkvetch ACEC to exclude a potential mineral site, thus reducing the difficulty in potentially developing the site and increase the likelihood of cost savings for ODOT.

As discussed earlier due to the inherent nature of mineral material deposits, it is not possible to specify the location of the mining sites, and therefore, it is not possible to quantify precisely the economic savings that future mining within the Planning Area could provide ODOT. However, ODOT's preliminary analysis suggest that there are numerous potential sites and adequate reserves to satisfy ODOT's identified aggregate needs. Based on this, it is estimated that there is a good likelihood that these alternatives could generate the similar cost savings and economic benefits as those identified for Alternative 1. However, due to the additional requirements and restrictions on the development of new mineral material sites under Alternatives 3 and 6, there is a greater possibility that the cost savings would be reduced by increased extraction costs (e.g. from additional compliance requirements) or increased haulage distances (e.g. from use of more distant alternative sites with lesser conflicting resource values).

Based on the analysis and assumptions discussed for Alternative 1, the total economic savings that could be gained under Alternatives 3, 6, and 7 is estimated to be about $1.33 million a year. If the cost savings are shared evenly been the state and region this would result in a cost savings of about $665,000 per year for the region, in which case the cost saving achieved by ODOT would be the same as those it could achieve under Alternative 1. This would result in no economic effects associated with these alternatives.

However, if ODOT incurs additional mining or haulage costs under these alternatives, (e.g. from additional mining or post extraction land restoration requirements associated with ACECs or other resource issues), there would be a potential to have a reduced cost savings benefit. Moreover, there would be indirect adverse economic effects on the region from cost cost savings benefits.

Alternative 4 would have about 327,170 acres open to mineral sales. This represents a reduction of about 75,200 acres or about 19 percent when compared to Alternative 1.

Alternative 4, unlike any of the other proposed alternatives, would require ODOT to use alternative aggregate sources first, before opening a new public land source, if alternative sources exist within 30 miles of a construction site. Because of this requirement, Alternative 4 would encourage use of private sources more than other proposed RMP alternatives. Alternative 4, therefore, would likely result in no cost savings for ODOT since it may very well decrease the amount of aggregate obtained from BLM compared with Alternative 1. Although the lack of available information on the location of specific BLM reserves makes it difficult to precisely determine the extent of the lost cost saving under this alterative, if ODOT is required to rely on private sources for most of its future aggregate mining needs, the adverse economic impacts to the region's economy would be up to $665,000 in lost cost savings and an associated six jobs that would have been generated by alternate use of the saved spending.

The indirect socioeconomic impacts for this alternative would follow directly from the direct socioeconomic impacts identified above. Compared with Alternative 1, it is expected that under Alternative 4 there would likely be no cost savings for ODOT from mining on BLM lands. The indirect economic impact from the "lost" savings would result in a loss of about 5.6 indirect jobs for the region annually that would have been generated by the region's economy from the lost cost savings. Similarly, it is also estimated that the loss of $665,000 in saving would result in about $0.4 million in lost indirect output for the region annually.

Under Alternatives 3, 6, and 7, BLM would have about 338,478 acres open to mineral sales. This represents a reduction of nearly 64,000 acres or about 16 percent in the available compared to Alternative 1. While the areas open to mining under these alternatives are the same as under Alternative 2, under these alternatives there could be additional operating requirements or restrictions on future mineral extraction if the sites are located within the Juniper Woodlands ACEC or Peck's Milkvetch.

Alternative 5 would open the least amount of acreage to mineral sales and would have about 304,700 acres open to mineral sales. This represents a reduction of about 25 percent when compared to Alternative 1.

Because of the reduced acreage available for mineral sales and the fairly high amount of acreage with restrictions, Alternative 5 would likely have few benefits to ODOT, given that agency's needs for aggregate and the costs associated with hauling. The extent to which these restrictions would reduce the potential cost savings to ODOT from use of BLM mining sites cannot be specified or quantified due to the uncertain nature of the reserve locations. However, under Alternative 5, mining restrictions are very similar to Alternative 2 except that the buffer zone limiting mining activities would be increased from one-eighth of a mile (Alternative 2) to one-half mile from residential development.

It is possible that the full cost savings of about $665,000 per year for the region could be achieved under this Alternative, in which case the cost saving achieve by ODOT would be the same as those it could achieve under Alternative 1. This would result in no economic impact associated with these alternatives. However, if ODOT incurs

additional mining or haulage costs under this alternative (e.g. from additional mining or land improvement procedures associated with ACECs or other resource issues), it would represent an adverse economic impact to the region from "lost" cost savings benefits.

This alternative has an increased potential for use requirements or restrictions that could result in decreased cost savings for ODOT and the region compared to the No Change Alternative. If in fact, the cost saving achievable by ODOT under this alternative would be the same as those it could achieve under Alternative 1, this would result in no economic impact. However, if ODOT incurs additional mining or haulage costs under this alterative (e.g. from additional mining or land improvement procedures associated with ACECs or other resource issues), it would result in indirect adverse economic impact to the region from "lost" cost savings benefits.

Forest Products
Alternatives 2, 4, and 5 would provide an estimated average annual timber harvest of about 120,000 cubic feet or 600,000 board feet (half as saw wood and half as chips).

The estimated commercial value of the harvestable saw wood would be about $90,000, depending upon demand and the estimated wood chip production would be 2,400 tons with a commercial value of about $38,400. The estimated total value of timber production under these alternatives would be $128,400 ($123,256 of which would be retained by the BLM and $5135 returned to the county of harvest if all sales were salvage or restoration). Compared to Alternative 1, these alternatives would generate an additional $75,000 of revenue in timber sales.

The IMPLAN Sector 26 – Agricultural, Forestry and Fishery Services most closely matches the timber harvesting activities and therefore has been used to estimate the direct employment effects of timber harvest. The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates 25.4 jobs. Therefore, the estimated increase of $75,000 in timber harvest revenues would generate about 2 jobs for the region annually.

The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates 9.7 indirect (and/or induced) jobs. Therefore, the estimated increase of $75,000 in timber harvesting would generate about 0.75 indirect jobs for the region annually.

The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates $0.64 million indirect (and/or induced) output spending. Therefore, the estimated increase of $75,000 in timber harvesting would generate about $48,000 in indirect output for the region annually.

Alternatives 3, 6, and 7 would project an average annual timber harvest on BLM managed lands in the Planning Area at 150,000 cubic feet or about 750,000 board feet (half as saw wood and half as chips). The estimated commercial value of the harvested saw wood would be about $112,500 and the wood chip would be about $48,000 (3,000 tons). The total commercial value of the timber production under these alternatives would be about $160,500 ($154,080 of which would be retained by BLM and $6,420 would be distributed to the county of harvest if all of these sales were salvage or restoration sales). Compared to Alternative 1, these alternatives would generate nearly $107,000 of additional annual revenue in timber sales.

The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates 25.4 jobs. Therefore, the estimated increase of $107,000 in timber revenues would generate about 2.7 jobs for the region annually.

The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates 9.7 indirect (and/or induced) jobs. Therefore, it is estimated that an increase of $107,000 in timber harvest spending would generate about one indirect job for the region annually.

The IMPLAN employment multipliers estimate that each $1 million of spending (in 2000 dollars) in this sector typically generates $0.64 million indirect (and/or induced) output spending. Therefore, it is estimated that an increase of $107,000 in timber harvest spending would generate about $68,000 in indirect output for the region annually.

Amenity Values

Under Alternatives 2 – 7 would all classify between 95 – 98 percent of lands in a Z-1 or Z-2 classification. The alternatives all emphasize retaining public lands to maintain or create large consolidated blocks of public open space with regional connectivity for improved quality of the recreational experience, including promotion of open space values associated with connected natural landscapes and opportunities for solitude.

Under Alternatives 2 and 4, the application of recreation management emphases would somewhat increase the range of recreational opportunities compared to Alternative 1. The majority of BLM lands (59 to 77 percent depending upon the alternative) would be managed with a multiple use with shared facilities emphasis. The remaining lands would be managed with an emphasis on non-motorized use and a small portion of the Planning Area would be managed as exclusive non-motorized use management or with a roads only low recreation emphasis. Open space values are marginally improved due to the increased range of recreational opportunities provided under the recreation management emphases.

Under Alternatives 2 and 4, areas open to mineral sales would be reduced by about 62,000 to 75,000 acres compared to Alternative 1, thus reducing the potential adverse visual impacts associated with surface mining activities.

Open space values are improved by an emphasis on maintaining and/or creating large consolidated blocks of open space. It is expected that some increases in amenity values based on an improved range of recreation opportunities would occur. Scenic values would be improved due to the localized vegetation restoration efforts, management and clean up of dump sites, and reductions in areas open to mineral sales. These represent beneficial effects associated with these alternatives. There would be minor, temporary adverse visual impacts associated with the prescribed burns, under the increased fire management program, with uncertain, though expected, long-term positive economic impacts to and within the local and regional economy.

There are several areas in which indirect economic effects may be seen within the local and regional economy. With any improvements to BLM lands in the planning area that would restore or enhance the landscape and its open space and scenic values, positive indirect socioeconomic effects would follow. Typical positive effects might include enhancement of quality of life factors for both residents and users, which have several follow-on effects within local and regional economies, such as expansion of the user base. Expansion of the user base would have certain indirect income effects in the local and regional economies. These indirect effects may be seen in continued demand for housing generating additional construction spending and employment associated with home construction, continued influx of retirees and additional spending in the region from transfer payments received from government and private retirement plans or investments, as well as continued movement into the region by the high tech and other light industries together with associated spending, and payments to communities in the region.

These alternatives all shift previously designated Zone 2 lands to Zone 1 lands. These alternatives would maintain large blocks of land with known resource values and would preserve a buffer between the rapidly growing communities of Redmond and Bend. Thus, indirect economic impacts of these alternatives should be comparable to those identified for Alternative 2. In addition, these alternatives would have a greater emphasis on maintaining lands for specific wildlife benefits. Given known local, regional and national preferences towards lands offering such opportunities, as in Alternative 2, efforts to maintain or enhance these attributes would have a positive quality of life impact on local resident users and non-local, non-resident users alike.

The greatest indirect economic impact is likely to be generated under Alternative 3 by the net decrease of nearly 2,500 community expansion acres being available for disposition compared to Alternative 1. These lands may also become ineligible for fairground or airport expansion. This would result in a loss of potential economic development opportunities for the region. The extent of deleterious economic development impacts would also depend on the availability of alternative sites and opportunities for meeting community expansion needs.

Local Roads

Alternative 2 would involve designing an integrated transportation system using existing local and historic roads (including existing county rights-of-way). This Alternative minimizes development of new rights-of-way on public lands. This alternative would have the highest density and most miles of collector roads of the action alternatives (the same as under Alternative 1, Table 4-27). The alternative includes an allocation of a transportation/utility corridor about one-half mile wide along the Burlington Northern-Santa Fe (BNSF) railroad right-of-way from south Redmond to Deschutes Junction. ODOT has indicated that it would not include an interchange at Quarry Road under this alternative. There would be no access from that corridor to the adjacent public lands. Under Alternative 2, some private lands could potentially be used for the future extension of the road to Deschutes Junction.

Alternatives 3- 7 would reduce the density and miles of collector roads and slightly increase the miles of local roads available for future designation or closure, leading to greater consolidation of the transportation system than under Alternatives 1 and 2.

The future local roadway configuration under this alternative is projected to be about 2800 miles. This would represent an increase of about 300 miles of local roads

Table 4-27. Road miles by alternative

	Road Miles by Alternative						
	Alt 1	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Arterial	218	224	220	224	224	224	224
Collector	302	302	104	104	104	104	104
Local, available for closure	2,562	2,562	2,808	2,808	2,808	2,808	2,808
County Historical roads	199	190	191	182	182	182	182
Powell Butte – Paulina Cr. Rd. (vacated)	0	0	8	8	8	8	8
Horner Rd. (vacated)	0	9	0	9	9	9	9
Regional Utility Corridors	202	202	202	202	202	202	202
Rights-of-way	781	781	781	781	781	781	781

compared with Alternative 1, with a comparable decrease in collector roads. The decrease in collector roads would reduce the agency's future operating and maintenance responsibilities. The extent of this reduction would be partially offset by the increase in future operating and maintenance requirements associated with the increase in local roads. However, since the annual maintenance requirements and costs for local roads are far less than those for collector roads, it is expected that there would be a net reduction in the agency's maintenance costs. Based on an estimated annual operating and maintenance cost of $2,200 for collector roads and $950 for local roads, the future road maintenance costs under this Alternative would decrease by about $210,000 compared to Alternatives 1 and 2. However, the current total annual road maintenance program budget for the Planning Area is only $26,000. Given that BLM current road maintenance program has extensive deferred maintenance needs, while the reduction in agency's maintenance responsibilities would have a positive economic effect in reducing the agency's future road maintenance responsibilities, the effect may be estimated to be negligible since it is not expected to result in any savings in actual future road maintenance spending.

Cumulative Effects

Alternatives 2 and 4 have similar social and economic effects and significance even though some aspects of these alternatives differ. Alternative 2 generally continues a mix of uses on BLM lands and resolves use and resource conflicts on a case-by-case basis rather than by separating land uses. Alternative 4 emphasizes increasing recreation opportunities with more separation of uses.

The socioeconomic impacts associated with these alternatives are expected to be positive. Implementation of these alternatives is estimated to result in as much as $0.182 million in increased spending and about five additional jobs in the region. Since a number of the impacts cannot be quantified, it is not possible to aggregate all impacts to determine the magnitude of the effects on the region's economy and social environment. The potential benefits of some of these unquantified impacts could be appreciable — especially the recreation-related effects.

The socioeconomic impacts identified under these alternatives are likely to be distributed over a wide variety of individuals and groups. Although the potentially greatest impacts may be expected to affect small specific user groups (e.g., recreational groups such as OHV users or target shooters), some of the more general impacts (e.g., amenity values and land ownership benefits) are expected to provide more broad, regional benefits to both resident and non-resident users. These alternatives are expected to provide a net beneficial socioeconomic impact on the region's economy and social environment. The benefits are expected to be relatively minor overall, and would be mostly dispersed (except for the recreational use impacts). A more specific and sizable socioeconomic benefit would derive from BLM's regional transportation contributions under Alternative 4.

There may be a wide variety of potential indirect socioeconomic impacts associated with the RMP alternatives, primarily associated with spending changes. Increases or decreases in spending within the region associated with the plan (e.g., from changes in agency program spending, user/visitor spending or resource use levels) would have indirect impacts from the related economic activity by dependant industries (e.g., local retail or service businesses).

In addition to the indirect economic impacts from spending, there may be socioeconomic impacts on the local users and communities from the RMP alternatives. As discussed in the resource specific analyses of impacts in Section 4, many of the direct impacts are not quantifiable, which means it is not possible to evaluate quantitatively the related indirect impacts. Aggregating non-quantifiable socioeconomic impacts can also be problematic, especially when the impacts affect a wide range of groups and individuals. The overall

net indirect socioeconomic impact of these alternatives has also been determined based on the limits of the available information.

All indirect socioeconomic impacts associated with these alternatives are expected to be beneficial. Implementation of these alternatives would result in about $116,800 in increased indirect spending and about two jobs in the region.

Direct and indirect benefits for each alternative have been evaluated using comparative analysis to extrapolate trends based on secondary data from regional, state, and national sources. This analysis suggests that there will be net positive social and economic benefits generated in the communities and counties within the boundaries of the BLM managed lands relative to Alternative 2 and, to a great extent, Alternative 4. Positive indirect effects are likely to include enhanced quality of life factors for both residents and users and enhanced areas for passive recreation uses. These indirect effects also may be reflected in the continued influx of retirees, and additional spending in the region from transfer payments received from government and private retirement plans or investments, the influx of high tech and other light industry business and employees, and the related housing demand and construction jobs.

Alternatives 3, 5, 6, and 7 have similar social and economic effects and significance, even though aspects of these alternatives differ somewhat. Alternative 3 generally decreases human uses in the source habitats and special management areas and ACECs to resolve user and resource conflicts. Alternative 5 emphasizes segregated, low conflict activities in more urbanized parts of the Planning Area and promotes higher-conflict uses in more rural areas. Alternative 6, more than any other alternative, relies on local governments to create recreation opportunities. It emphasizes reducing conflicts between wildlife management and human activities in rural areas rather than in urban areas. Alternative 7 offers the greatest opportunity for using exchange lands to support the acquisition of other desirable lands, and generally emphasizes recreational uses that are managed for lower conflicts with wildlife in the areas away from population centers.

Nearly all of the socioeconomic impacts associated with Alternatives 3, 5, 6 and 7 would be beneficial. Implementation of these alternatives could result in as much as $450,000 in increased spending and as many as 12 additional jobs in the region. In addition, there are substantial potential economic development benefits associated with the regional transportation system improvements facilitated by BLM's land resources under these alternatives. This economic development impact could potentially represent the greatest socioeconomic impacts associated with these alternatives.

Since a number of the impacts cannot be quantified, it is not possible to aggregate these impacts to determine the full magnitude of the ultimate effects on the region's economy and social environment. The potential magnitude of some of these unquantified impacts could be appreciable — especially the recreation-related effects.

In any case, the socioeconomic impacts identified under these alternatives would be distributed over a wide variety of individuals and groups. While the potentially greater impacts may be expected to affect small specific user groups (e.g., recreational groups such as OHV users or target shooters), some of the more general impacts (e.g., amenity values and land ownership benefits) may be expected to benefit most of the region's inhabitants and visitors.

These alternatives are expected to have a net beneficial socioeconomic impact on the region's economy and social environment. However, these benefits are expected to be relatively minor, except for the economic development impacts associated with BLM's regional transportation contributions and will be mostly dispersed (except for the recreational use impacts).

There may be a wide variety of potential indirect socioeconomic impacts associated with these RMP alternatives. The primary indirect impacts would be associated with spending changes associated with these RMP alternatives. Increases or decreases in spending within the region associated with the plan (e.g., from changes in agency program spending, user/visitor spending or resource use levels) will have indirect impacts from the related economic activity by dependent industries (e.g., home building, local retail, or service businesses).

Other potential indirect negative impacts could include artificially high local and regional land values resulting in a decrease of locally affordable housing opportunities, and the potential redistribution of particular sectors of the local communities. Similarly, these lands may also become ineligible for fairground or airport expansion, thus resulting in a loss of potential economic development opportunities for the region. The extent of deleterious economic development impacts will also depend on the availability of alternative sites and opportunities for meeting community expansion needs.

In addition to the indirect economic impacts from spending impacts, there may be socioeconomic impacts on the local users and communities from the RMP alternatives. As discussed in the resource-by-resource analyses of these impacts in Section 4, in most cases, the magnitude of these impacts can not be quantified since the existing causal relationship are generally complex and interdependent on other factors. Furthermore, since many of the direct impacts of the RMP alternatives are not quantifiable, it is not possible to evaluate quantitatively any related indirect impacts.

As discussed for the direct impacts, aggregating the alternative's non-quantifiable socioeconomic impacts can be problematic, particularly when the indirect impacts may affect a wide variety of groups and individuals. In any case, the main indirect impacts by resource topic associated with the alternative are presented below. The overall net indirect socioeconomic impact of the alternative also has been determined based on the limits of the available information.

Most of the indirect socioeconomic impacts associated with these alternatives are expected to be beneficial. Implementation of these alternatives is estimated to result in up to $287,000 in increased indirect spending and 1 to 3.3 jobs in the region. In addition, there could be substantial indirect socioeconomic benefits to the region associated with future economic development facilitated by BLM assistance in resolving the Yew Avenue interchange transportation problems.

Alternative 1
This alternative continues the Brothers/La Pine Management Plan. Generally, Alternative 1 considered together with the other past, present and reasonably foreseeable federal, regional and local plans and projects described above would have no significant adverse cumulative impacts. Cumulatively, this alternative would contribute only slightly to variations in local economic activity, employment and income generated by BLM-managed resources. The primary causes of economic and social change in the area would be underlying national and regional economic trends. BLM management actions would minimally influence regional population growth.

Alternative 2
This alternative continues the general direction of the Brothers/La Pine Management Plan but changes emphasis or helps clarify management objectives in that plan. This alternative retains 89 percent of the Planning Area as Zone 1 lands, preserving the areas undeveloped and natural character, and preserving the greenbelt buffer between rapidly growing urban areas in Bend and Redmond. This alternative increases and improves recreational opportunities in the Planning Area and offers potential development of recreational amenities for local communities. Generally, Alternative 2 considered together with the other past, present and reasonably foreseeable federal, regional and local plans

and projects described above would have no adverse cumulative impacts. Cumulatively, this alternative would contribute only slightly to variations in local economic activity, employment and income generated by BLM-managed resources. The primary causes of economic and social change in the area would be underlying national and regional economic trends. BLM management actions would minimally influence regional population growth. However, Alternative 2 would likely have a beneficial cumulative social impact when considered in conjunction with other plans and projects in the area, since the project increases and improves recreational opportunities, one of the region's priorities given its fast-paced development.

Alternative 3
Alternative 3 places greater limitations on human activities in source habitats and areas having hydrologic or other ecosystem problems. It would involve managing 20 percent of the Planning Area exclusively for non-motorized uses. This alternative also retains 89 percent of the Planning Area as Zone 1 lands, preserving the areas undeveloped and natural character, and preserving the greenbelt buffer between rapidly growing urban areas in Bend and Redmond. Similar to Alternative 2, therefore, Alternative 3 considered together with the other past, present and reasonably foreseeable federal, regional and local plans and projects described above would have no adverse cumulative impacts. Cumulatively, this alternative would contribute only slightly to variations in local economic activity, employment and income generated by BLM-managed resources. The primary causes of economic and social change in the area would be underlying national and regional economic trends. BLM management actions would minimally influence regional population growth. However, as with Alternative 2, Alternative 3 could also offer some beneficial cumulative social impacts by retaining a high percentage of land for recreation.

Alternative 4
Alternative 4 emphasizes improving or increasing the spectrum of recreational opportunities in the Planning Area and separating uses. This alternative would involve managing 30 percent of the Planning Area with an emphasis on non-motorized uses. Further, this alternative offers the opportunity to use land exchanges to acquire other desirable lands in the Planning Area. This alternative also emphasizes wildlife travel and connectivity corridors. Similar to previous alternatives therefore, Alternative 4 considered together with the other past, present and reasonably foreseeable federal, regional and local plans and projects described above would have no adverse cumulative impacts. Cumulatively, this alternative would contribute only slightly to variations in local economic activity, employment and income generated by BLM-managed resources. The primary causes of economic and social change in the area would be underlying national and regional economic trends. BLM management actions would minimally influence regional population growth. Similar to previous alternatives, however, Alternative 4 could also offer some beneficial cumulative social impacts by emphasizing not only recreational opportunities but also wildlife and ecosystem needs. Because of the region's rapid development and shortage of land for a variety of uses, the cumulative social benefits associated with an alternative that considers the needs of users, wildlife and the ecosystem could be substantial when considering social values of the region.

Alternative 5
Alternative 5 emphasizes segregated, low conflict activities in more urbanized parts of the Planning Area and promotes higher-conflict uses in more rural areas. This alternative seeks to reduce conflicts between users and residents in urbanized areas around Bend and Redmond. Similar to previous alternatives, therefore, Alternative 5 considered together with the other past, present and reasonably foreseeable federal, regional and local plans and projects described above would have no adverse cumulative impacts. Cumulatively, this alternative would contribute only slightly to variations in local economic activity, employment and income generated by BLM-managed resources. The primary causes of economic and social change in the area would be underlying national

and regional economic trends. BLM management actions would minimally influence regional population growth. Similar to previous alternatives, however, Alternative 5 could also offer some beneficial cumulative social impacts by emphasizing conflict reduction in more urban parts of the Planning Area. In particular, when considered together with the type of planning goals outlined in the Redmond 2020 Comprehensive Plan (City of Redmond, 2001) and the Bend Area General Plan (City of Bend, 1998), this alternative would offer cumulative beneficial social impacts to those urban communities.

Alternative 6
Alternative 6, more than any other alternative, relies on local governments to create recreation opportunities in urban core areas. This alternative, in contrast to Alternative 5, emphasizes reducing conflicts between wildlife management and human activities in rural areas rather than in urban areas. Alternative 6 considered together with the other past, present and reasonably foreseeable federal, regional and local plans and projects described above could have some slightly adverse cumulative impacts because of its reliance on local governments to develop urban recreational opportunities. Generally, however, this alternative would contribute only slightly to variations in local economic activity, employment and income generated by BLM-managed resources. The primary causes of economic and social change in the area would be underlying national and regional economic trends. BLM management actions would minimally influence regional population growth.

Alternative 7
Alternative 7 offers the greatest opportunity for using exchange lands to support the acquisition of other desirable lands within the Planning Area. Also, Alternative 7 generally emphasizes recreational use that is managed for lower conflicts with wildlife in the areas away from population centers. Similar to previous alternatives, therefore, Alternative 7 considered together with the other past, present and reasonably foreseeable federal, regional and local plans and projects described above would have no adverse cumulative impacts. Cumulatively, this alternative would contribute only slightly to variations in local economic activity, employment and income generated by BLM-managed resources. The primary causes of economic and social change in the area would be underlying national and regional economic trends. BLM management actions would minimally influence regional population growth. Similar to previous alternatives, however, Alternative 7 could also offer some beneficial cumulative social impacts by emphasizing greater exchange land possibilities and reducing potential wildlife conflicts near population centers.

Environmental Justice

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994) requires that all federal agencies "make achieving Environmental Justice part of [their] mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

As indicated in Table 3-1, Population Profile 2000 Race/Ethnicity Distribution (Chapter 3), neither of the counties covered by the planning area has minority populations above the rate for the state of Oregon. The 2000 Census findings show that neither Crook nor Deschutes counties have poverty rates above the rate for the state of Oregon. See Table 4-28, below.

No ethnic groups or low income populations have been identified as being disproportionately adversely impacted under the No Action or Action Alternatives considered for the planning area.

Table 4-28. Percentage of Population below Poverty Level for All People in Poverty for Oregon, Crook County, and Deschutes County According to 2000 Census.

	All people in poverty - 1999
Area	**Percent**
Oregon	11.6
Crook	11.3
Deschutes	9.3

Source: http://www.ers.usda.gov/data/povertyrates/PovListpct.asp?st=OR&view=Percent

Chapter 5
Consultation and Coordination

In the fall of 2000, the Bureau of Land Management (BLM), Prineville District, reinitiated the Upper Deschutes Resource Management Plan (RMP) Environmental Impact Statement (formerly the Urban Interface EIS) in an effort to respond to growing concerns over the expanding and changing needs of the urban interface areas. The RMP will amend (update) needed sections of the Brothers/La Pine RMP and the Two Rivers RMP in response to changing issues identified through consultation and coordination with interested and affected groups and individuals. This chapter includes a brief description of the process used during the preparation of the Draft Environmental Impact Statement and Resource Management Plan to keep people informed about and involved in the decision process.

Information Sharing

Federal Register Notice

A Notice of Intent was published in the Federal Register in 1995. The announcement contained a request for comments and issues to be addressed in the RMP and concerns over managing public lands.

Analysis of the Management Situation

In October 2001, the Analysis of the Management Situation (AMS) was published. The document identified preliminary issues based on internal meetings of BLM specialists and managers, meetings with tribal and local government representatives, calls and letters from the general public received over the previous ten years, and public scoping meetings conducted during earlier attempts to amend the existing RMP (for the "Central Oregon Urban Interface Plan Amendment"). Comments on the AMS served as a resource for members of the Issue Team during the collaborative process. The AMS also included an Issue Team Application and an invitation to participate in the collaborative planning process.

Public Meetings & Field Trips

During the comment period for the AMS, public meetings were held in Redmond on October 16, 2001, in Prineville on October 17, 2001, and in La Pine on October 18, 2001. The BLM requested public comments on the AMS through announcements in local newspapers, and in the cover letter on the AMS (mailed to about 1,200 people in October 2001). The BLM also held public field trips to various sites of interest within the planning area. These field trips took place on October 20, 2001 in the area west of the Powell Butte Highway, on October 21, 2001 in the La Pine area and on October 27, 2001 in the area east of the Powell Butte Highway.

Throughout the planning process there have been frequent meetings open to the public and advertised through some of the techniques mentioned earlier, including radio and newspaper releases and updated on our Web Site.

Web Site

A web site for the Upper Deschutes Resource Management Plan process has been maintained since publication of the AMS. The site includes periodic updates on plan progress, meeting dates, a link to information about issues and alternatives as they have developed, including maps and summaries, and an e-mail contact. It also includes a link to the AMS and associated maps and to the results of the social survey conducted by the

University of Oregon during the planning process. Issue Team and PAC meeting dates were also posted, as well as the telephone numbers of the BLM interdisciplinary team.

Plan Updates

The agency also offered periodic plan updates that were posted to the website and mailed to all members of the UDRMP mailing list. News releases were broadcast on local television and/or radio stations, and placed in local newspapers.

Collaborative Planning

BLM Process

The proximity of BLM lands to local communities increases use demands and the need for partnerships and coordination to provide for multiple needs and reduce conflicts. Public and other government participation during this planning process occurred mainly in a community-based framework. This process included using focus groups chartered specifically for this process, as well as including other separate but related governmental collaborative processes like the South Redmond Collaborative Planning Group.

The collaborative process was designed to put governments and citizens together to resolve the significant planning issues. See Table 5-1 for a list of key public involvement events. The following groups contributed to the planning effort in a variety of ways:

Intergovernmental Agency Representatives – Includes federal, state, or local governmental partners that have overlapping or contiguous jurisdictions, or provided special information or expertise in the Draft Environmental Impact Statement.

Deschutes Provincial Advisory Committee (PAC) & Subcommittee – A committee formally chartered under the Federal Advisory Committee Act to provide a broad representation of interests to advise to federal land managers within the Province. A subcommittee of the full PAC was assigned to act on behalf of the full PAC during this process. The PAC recommended the BLM develop the range of alternatives that included Alternatives 1-7, and they go forward with consensus recommendations from the Issue Team. The PAC holds quarterly meetings open to the public. The PAC membership list can be found in Table 5-2

Issue Teams - Working groups chartered by the PAC to focus on specific planning issues. The Issue Team included representatives of the general public, specific interest groups, permit holders, other stakeholders, and intergovernmental representatives. Subcommittees of the Issue Team focused on clarifying issues and developing alternatives around specific issue categories. These teams met frequently to develop concepts around which the alternatives were designed. All Issue Team meetings were open to the public. The Issue Team membership list is in Table 5-3.

Preferred Alternative Subcommittee - After the descriptions of the range of alternatives were completed by the BLM, the Issue Team was reorganized to focus on evaluating the range of alternatives and developing areas of consensus on a preferred alternative. For that process, the Issue Teams arranged themselves into five smaller groups based on the interests they had identified early in the process. In some cases, they were similar teams to those organized around the issue categories. These teams rated and ranked the interest categories, rated the alternatives according to the categories, and selected a few members to act on their behalf to work on consensus on a Preferred Alternative. The results of

Table 5-1. Key Public Involvement Events

Date	Event summary
10/01	Analysis of the Management Situation published and mailed
10/16/01	Public meeting, Redmond
10/17/01	Public meeting, Prineville
10/18/01	Public meeting, La Pine
10/20/01	Public tour, area west of Powell Butte Highway
10/21/01	Public tour, La Pine area
10/27/01	Public tour, area east of Powell Butte Highway
1/12/01	All Issue Team meeting
4/11/01	Deschutes Province Advisory Committee (PAC) meeting
6/20/01	PAC meeting
9/21/01	PAC meeting
12/10/01	Issue Team meeting – Land Uses
12/10/01	Issue Team meeting – Recreation
12/11/01	Issue Team meeting – Land Ownership
12/11/01	Issue Team meeting – Ecosystem
12/14/01	Issue Team meeting – Transportation & Access
12/14/01	Issue Team meeting – Public Health & Safety
1/7/02	Issue Team meeting – Land Uses
1/7/02	Issue Team meeting – Transportation & Access
1/9/02	Issue Team meeting – Land Ownership
1/9/02	Issue Team meeting – Ecosystem
1/14/02	Issue Team meeting – Public Health & Safety
1/14/02	Issue Team meeting – Recreation
1/16/02	PAC meeting
1/17/02	Issue Team meeting – Archaeology
1/29/02	All Issue Team
1/31/02	Issue Team meeting – Ecosystem
2/1/02	Issue Team meeting – Land Ownership
2/4/02	Issue Team meeting – Transportation & Access
2/5/02	Issue Team meeting – Public Health & Safety
2/6/02	Issue Team meeting – Archaeology
2/11/02	Issue Team Meeting – Land Uses
2/13/02	Issue Team meeting – Social/Economics
2/25/02	Issue Team meeting – Transportation & Access
2/26/02	Issue Team meeting – Public Health & Safety
2/27/02	Issue Team meeting – Archaeology
3/1/02	Issue Team meeting – Ecosystem
3/6/02	Issue Team meeting – Archaeology
3/11/02	Issue Team Meeting – Land Uses
3/13/02	Issue Team meeting – Land Ownership
3/13/02	Issue Team meeting – Land Ownership
5/13/02	Issue Team Meeting – Land Uses
5/14/02	Issue Team meeting – Public Health & Safety
5/15/02	Issue Team meeting – Archaeology
5/16/02	Issue Team meeting – Recreation
5/17/02	Issue Team meeting – Public Health & Safety
5/17/02	Issue Team meeting – Social/Economics
5/20/02	Issue Team meeting – Ecosystem
5/21/02	Issue Team meeting – Transportation & Access
5/22/02	Issue Team meeting – Land Ownership
5/28/02	Issue Team Meeting – Land Uses

Table 5-1. Key Public Involvement Events (continued)

	Date	Event summary
	6/19/02	PAC meeting
	6/21/02	All Issue Team meeting
	9/11/02	PAC meeting
	11/26/02	Issue Team meeting – Social/Economics
	12/10/02	All Issue Team meeting
	2/11/03	All Issue Team meeting
	2/25/03	Preferred Alternative Subcommittee meeting
	3/4/03	Preferred Alternative Subcommittee meeting
	3/11/03	Preferred Alternative Subcommittee meeting
	3/14/03	PAC meeting
	3/17/03	Preferred Alternative Subcommittee meeting
	3/20/03	Preferred Alternative Subcommittee meeting
	4/1/03	All Issue Team meeting
	6/11/03	PAC meeting
	10/2003	Proposed RMP and DEIS published and mailed

Table 5-2. Deschutes Provincal Advisory Committee (PAC); PAC subcommittee members have astrick by last name.

Last name	First name	Interest	Organization
ACHTERMAN	GAIL	AT LARGE REPRESENTATIVE	DESCHUTES RESOURCE CONSERVANCY
ARDT*	GLEN	STATE AGENCY	OREGON DEPT OF FISH & WILDLIFE
BURLEY	CHUCK	FOREST PRODUCTS	BURLEY & ASSOCIATES, LLC
CARLSON	DENNIS	AT LARGE REPRESENTATIVE	HOOD RIVER COUNTY DEPT OF FORESTRY
CHAUDET*	MOLLIE	FEDERAL AGENCIES (BLM/USFS)	PROVINCE LIAISON
CORDOVA*	JERRY	FEDERAL AGENCY	US FISH & WILDLIFE SERVICE
ERICKSON	DAN	COUNTY GOVERNMENT	WASCO COUNTY
FOWLER	BRAD	FOREST PRODUCTS	FOWLER TIMBER COMPANY
GENTRY	DON	TRIBAL GOVERNMENT	KLAMATH TRIBE
GILL*	KENT	ENVIRONMENTAL	FRIENDS OF THE METOLIUS
HENRIKSON	GERALD	FEDERAL AGENCY	BUREAU OF INDIAN AFFAIRS
LAMB	BONNIE	STATE AGENCY	DEPT OF ENVIRONMENTAL QUALITY
LESLIE	DAVE	COUNTY GOVERNMENT	DESCHUTES COUNTY PLANNING DEPT
LILLEBO*	TIM	ENVIRONMENTAL	OREGON NATURAL RESOURCES COUNCIL
MCCLAIN	DAVE	MINERAL INDUSTRY	PRIVATE CONSULTANT
NELSEN	RICHARD	LIVESTOCK GRAZING ON FEDERAL LAND	RANCHER, BLM GRAZING PERMITTEE
OLIPHANT	DENNIS	RECREATION/TOURISM	SUN COUNTRY TOURS INC
PENHOLLOW*	CLAY	TRIBAL GOVERNMENT	CONFEDERATED TRIBES OF WARM SPRINGS RESERVATION
THOMAS*	SARAH	COUNTY GOVERNMENT	CROOK COUNTY REP.
TOWNE	ROBERT	FEDERAL AGENCY	BLM FIELD MANAGER
TWETEN	RANDY	FEDERAL AGENCY	NATIONAL MARINE FISHERIES SERVICE
WELDON	LESLIE A.C.	FEDERAL AGENCY	DESCHUTES NATIONAL FOREST
WICKMAN*	BOYD	USFS RESEARCH	PRINGLE FALLS EXPERIMENTAL FOREST

Table 5-3. Issue Team Members, Past and Present

Last name	First name	Organization	City
ANDERSON	JIM		SISTERS
ANGELL	JIM		BEND
ARDT	GLEN	OREGON DEPT OF FISH & WILDLIFE	BEND
BABB	GEOFF	NATURE CONSERVANCY OF OREGON	BEND
BELL	JEFF	USFS, Ochoco NF	
BERAUD	BOB	BONNEVILLE POWER ADMIN	PORTLAND
BIRD	SALLY	CONFEDERATED TRIBES OF WARM SPRINGS RESERVATION	WARM SPRINGS
BOYER	JEFF		BEND
BROWN	DICK	CITY OF PRINEVILLE	PRINEVILLE
BURLEY	CHUCK	BURLEY & ASSOCIATES, LLC	BEND
CARLSON	MERRIE SUE	GOVERNMENT OFFICE OF THE STATE OF OREGON	BEND
CARLSON	SCOTT	HOOKER CREEK COMPANIES, LLC	BEND
COOPER	SCOTT	CROOK COUNTY COURT	PRINEVILLE
CRUME	BUTCH		LA PINE
DAVIS	RANDALL	OREGON DEPT OF TRANSPORTATION	BEND
DAVISON	BOB	WILDLIFE MANAGEMENT INSTITUTE	BEND
DEBOODT	TIM	CROOK CO EXTENSION SERVICE	PRINEVILLE
DEVONEY	MARK	OREGON DEPT OF TRANSPORTATION	BEND
DUFOURD	JOANI	CENTRAL OR. MOTORCYCLE & ATV CLUB	BEND
ECCLES	TERRY	OREGON PARKS AND RECREATION	SALEM
FAULKNER	ED		PRINEVILLE
FENTY	BRENT	ONDA	BEND
FERRY	BRIAN	OREGON DEPARTMENT FISH & WILDLIFE	PRINEVILLE
FLOREY	KEN		BEND
FOCKLER	BILL	OREGON EQUESTRIAN TRAILS	BEND
FORBES	JOHN	LPPRD	LA PINE
FROST	RUSS	OREGON DEPT OF TRANSPORTATION	BEND
GILL	KENT	FRIENDS OF THE METOLIUS	CAMP SHERMAN
GRAVES	BOB		BEND
GRAVES	MIMI		BEND
GRAY	SUSAN	ASCO	BEND
HAMMER	KATIE	Central Oregon PARKS & REC DISTRICT	REDMOND
HARTWELL	RAY	DESCHUTES RESOURCE CONS.	BEND
HENSLEY	JIM	CROOK COUNTY UNDERSHERIFF	PRINEVILLE
HILDEBRANDT	JAMIE	ROCK SPRINGS GUEST RANCH	BEND
HILLER	DAVID		SISTERS
HINMAN	RICK	CENTRAL ELECTRIC COOP, INC	REDMOND
HOLMES	MATT	ONDA	BEND
HOLMQUIST	ANNE		REDMOND
HUNT	BRUCE	CENTRAL ELECTRIC COOPERATIVE	REDMOND
JININGS	JON	DEPT OF LAND CONSERVATION & DEV	BEND
JOHNSON	JERRY	OUR PUBLIC PROPERTIES	LA PINE
JOHNSON	LIBBY	DEPARTMENT OF ENERGY, BPA	THE DALLES
JORGENSEN	STEVE	DESCH. COUNTY COMMUNITY DEVEL.	BEND
KACHLEIN	BELINDA		BEND
KELLER	ALAN	CROOK COUNTY LANDFILL	PRINEVILLE
KIMBALL	KATE		BEND
LAMB	BONNIE	DEPT ENVIRONMENTAL QUALITY	BEND

Table 5-3. Issue Team Members, Past and Present

Last name	First name	Organization	City
LILLEBO	TIM	OREGON NATURAL RESOURCES COUNCIL	BEND
LONSDALE	SANDY	JUNIPER GROUP SIERRA CLUB	BEND
MALARKEY	DIDI		EUGENE
MCCAFFREY	BILL	OREGON MILITARY DEPARTMENT	BEND
MCCAULOU	SCOTT	DESCHUTES RESOURCE CONSERVANCY	BEND
MCMULLEN	CHAD	HOOKER CREEK	BEND
MCNIGHT	BRETT	DEPT. OF ENVIRONMENTAL QUALITY	BEND
MILLER	LARRY	OREGON PARKS & RECREATION DEPT	BEND
MILLER	RON		REDMOND
MORROW	CATHERINE	DESCHUTES COUNTY PLANNING DIVISION	BEND
NORTON	M L	CENTRAL ELECTRIC COOPERATIVE	REDMOND
OLIPHANT	DENNIS	SUN COUNTRY TOURS INC	BEND
PENHOLLOW	CARY	CENTRAL OR IRRIGATION DISTRICT	REDMOND
PENHOLLOW	CLAY	CONFED. TRIBES OF WARM SPRINGS RES.	WARM SPRINGS
PETERSON	BILL	USDA FOREST SERVICE, BEND/FORT ROCK	BEND
PEWTHER	JOHN	REDMOND PLANNING COMMISSION	REDMOND
PIEPER	BARBARA		SISTERS
PIEPER	DARRELL		SISTERS
PONTE	GEORGE	OREGON DEPARTMENT OF FORESTRY	PRINEVILLE
SAILORS	TAMMI	C.OR IRR. DIST	REDMOND
SCHLOER	WALT	USDA FOREST SERVICE, FORT ROCK	BEND
SCHONBORN	LYN		BEND
SCHONNEKER	CHUCK	NORTH UNIT IRRIGATION DISTRICT	MADRAS
SINGHOSE	SUSAN		BEND
SINGHOSE	WAYNE		BEND
STEWART	JON	DESCHUTES NATIONAL FOREST	BEND
STOUT	DOUG		BEND
STROME	DARSIE		BEND
SUTHERLAND	JO ANNE	CITY OF REDMOND	REDMOND
THOMAS	SARAH	CROOK COUNTY REP.	PRINEVILLE
THOMASBERG	PAUL		BEND
THORN	BRUCE	QUAIL VALLEY RANCH	SALEM
TOMJACK	TOM & MARY		BEND
TONSFELDT	WARD		BEND
TOWE	MARIE	Crooked River RANCH RIDERS CLUB	Crooked River RANCH
UNGER	ALAN	CITY OF REDMOND	REDMOND
VAN VLIET	ALAN	EAGLE CREST	REDMOND
WALLACE	KERRIE		POWELL BUTTE
WHIPPLE	BRIGETTE	CONFEDERATED TRIBES WARM SPRINGS	WARM SPRINGS
WICKMAN	BOYD		BEND
WINCH	MARTIN		BEND
WOLFENBARGER	BOB		LEBANON
WOOLLEY	LAREN	EMPIRE CORP PARK	BEND
YODER	KATY		BEND
YOUTIE	BERTA		PRINEVILLE
ZAKRAJSEK	LARRY	BUREAU OF RECLAMATION	BEND
ZELENKA	BILL	CROOK COUNTY PLANNING DEPARTMENT	PRINEVILLE

the subcommittee work were returned to the Issue Team. The larger group finalized the Preferred Alternative consensus recommendation that was forwarded to the PAC and subsequently to the BLM.

Other Collaborative Processes

In addition to the process designed for the Upper Deschutes Resource Management Plan, the BLM also participates in other related interagency efforts to address community needs such as public land uses and ownership, transportation, and healthy watersheds. A brief summary of some of the more directly related on-going efforts and their relationship to this Resource Management Plan are described below.

South Redmond Collaborative Planning Group

The Governor of Oregon sponsors a state-wide Community Solutions Team composed of various state agency representatives and charged with collaboratively solving problems of growth and development within the state between, state, and local governments. This team recognized the potential for problems associated with different, sometimes ambiguous, or conflicting missions of federal, state, and local governments related to the growth of Redmond. They pulled together representatives from the BLM, OMD, ODOT, DLCD, Deschutes County and the City to discuss the potential conflicts and demands and seek solutions that could, among other things, form the basis for some parts of the alternatives that would be evaluated by the BLM in the RMP. A key component of the collaboration process was the ability to combine evaluation and decision processes between agencies, thus saving substantial money, time, and resources needed to finalizing important regional growth and development decisions.

The South Redmond Collaborative Planning Group provided a forum for developing alternatives to resolve regional transportation issues between Bend and Redmond, around the Redmond Airport, and community needs for public lands adjacent to the City of Redmond. These components were, reviewed, and subsequently included in the range of alternatives and in the consensus recommendation on the Preferred Alternative. The Preferred Alternative and Draft Environmental Impact Statement will form the basis for the City and County to pursue a Regional Problem Solving Strategy to amend their Transportation System Plan.

City of Redmond Urban Reserve Study

The City of Redmond is in the process of completing a 50-year urban reserve study to predict buildable lands needed to meet expected state requirements. The BLM is participating in this process and used early calculations of expected need to identify lands available for community expansion in several alternatives, including the Preferred.

Prineville Reservoir Resource Management Plan and State Park Master Plan
The USDI Bureau of Reclamation and the Oregon Parks and Recreation Department have recently completed a management plan to guide recreation and the use of resources within the Prineville Reservoir area. This lies within the Planning Area, but is on land withdrawn from BLM jurisdiction. BLM representatives participated on the Ad Hoc Work Group and Technical Teams for the Prineville Reservoir EA, and representatives from the BOR also participated on the Issue Team during this process to ensure that the plans would match consistent management direction where necessary.

Sub-basin and Water Quality Restoration Planning

BLM is participating in several newly begun or ongoing Deschutes basin evaluation efforts that have and will continue to contribute important information to the Resource

Management Plan. These include the joint Water Quality Restoration Project for the Upper and Little Deschutes sub-basins, and the Northwest Power Planning Council sub-basin planning process, and the in-stream flow assessment for the lower Crooked River. These are ongoing collaborations between government agencies like the Forest Service, BLM, and USGS, as well as between local non-profit organizations like the Upper Deschutes and Crooked River Watershed Councils, and the Deschutes Resources Conservancy.

Millican-West Butte Road

Following passage of the Millican-West Butte Road legislation, Crook County began working on construction details, including final location and design, and completing a description of the kinds of environmental impacts associated with the project. The purpose of this is to ensure consistency with the legislation and assure that appropriate mitigation for wildlife species and recreational values are considered. The BLM will continue to provide support and information to that process as needed. Descriptions about changes to any resource conditions in the area as a result of the construction activities will be incorporated as necessary between the Draft and Final EIS.

Agencies and Organizations Consulted

The Prineville District BLM mailed the public scoping packet (AMS) to approximately 1,200 agencies, organizations, and individuals. The "Summary of the AMS" was mailed to approximately the same number of recipients. The mailing list currently includes approximately 1,690 names of agencies, organizations and individuals to which this draft Upper Deschutes RMP/EIS was sent. The following lists are representative of the entities on the mailing list:

Elected Officials

Bend City Council
Crook County Representative
Crook County Undersheriff
Deschutes County Board of Commissioners
Government Office of the State of Oregon
Jefferson County Board of Commissioners
Sisters City Council

Tribal Groups

Burns Paiute Tribe
Confederated Tribes of Warm Springs
Klamath Tribes

Agencies

Barlow/Bear Springs Ranger District
Bonneville Power Administration
Bureau of Reclamation
Central Electric Cooperative
Central Oregon Irrigation District
Central Oregon Parks and Recreation District
City of Prineville
City of Redmond
City of Redmond Planning Department
Crook County Court

Crook County Extension Service
Crook County Landfill
Crook County Planning Department
Department of Energy, BPA
Department of Environmental Quality
Department of Environmental Quality
Department of Land and Conservation Development
Deschutes County Community Development
Deschutes County Planning Division
Hood River County Forestry Department
Hood River Ranger District
Klamath County Extension Service
Klamath County Planning Department
National Marine Fisheries Service
North Unit Irrigation District
Oregon Department of Fish and Wildlife
Oregon Department of Forestry
Oregon Department of Transportation
Oregon Division of State Lands
Oregon Military Department
Oregon Parks and Recreation
State Historic Preservation Office
USDA Fish and Wildlife Service
USDA. Forest Service, Bend-Fort Rock Ranger District
USDA Forest Service, Deschutes National Forest
USDA Forest Service, Ochoco National Forest
USDE Bonneville Power Administration - EWP
Wasco County

Organizations/Businesses

Archaeological Society of Central Oregon
Burley & Associates, LLC
Central Electric Co-op, Inc.
Central Oregon Motorcycle and ATV Club
Central Oregon Partnership
Crooked River Ranch Riders Club
Deschutes Resource Conservancy
Eagle Crest
Empire Corporation Park
Fowler Timber
Friends of the Metolius
Hooker Creek Companies, LLC
La Pine Parks and Recreation District
Nature Conservancy of Oregon
Oregon Equestrian Trails
Oregon Natural Desert Association
Oregon Natural Resources Council
Our Public Properties
Quail Valley Ranch
Rock Springs Guest Ranch
Sierra Club, Juniper Group
Sun Country Tours, Inc.
Wildlife Management Institute

Others

Interested public not affiliated with an above-mentioned group
Livestock grazing permittees
Miscellaneous additional businesses
Recreationists
Special recreation permittees

Preparers

The following table (Table 5-4) contains the primary members of the Prineville District Interdisciplinary Team who were responsible for the preparation of this document. Following the table are lists of other District and State Office personnel who assisted in the preparation and/or review of this document.

Other Prineville District BLM preparers/reviewers

Barron Bail, District Manager
Jennifer Collins, Writer/Editor
James Grace, Computer Specialist
Janet Hollister, Writer/Editor
Lawrence MacDonald, Computer Specialist
Jean Nelson-Dean, Prineville District Planning and Environmental Coordinator
Berry Phelps, Recreation Planner
William Pieratt, Noxious Weeds Specialist
John Swanson, Rangeland Management Specialist
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BLM State Office contributors/reviewers

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George Buckner, Wildlife Biologist
Robert DeViney, Chief of Realty/Records
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Mike Hamel, Visual Information Specialist
Richard Hanes, Archaeologist
Nancy Ketrenos, Geologist
Craig Mackinnon, Rangeland Mgmt. Specialist
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Jim Rounds, Cartographer
Joan Seevers, Botanist
Eric Stone, Planning and NEPA Specialist
Ron Price, Outdoor Recreation Planner
Dave Harmon, Forester/NLCS Coordinator
Margaret Wolf, Outdoor Recreation Planner

Table 5-4. Interdisciplinary Team for Upper Deschutes Resource Management Plan

Name and Title	Education	Experience
Keith Brown *Outdoor Recreation Planner*	B.S. Natural Resource Economics, University of Vermont; M.S. Recreation Resources, Colorado State University	Prineville District Recreation Planner for past 2 years. Over 10 years seasonal recreation work experience in the non-profit, for-profit, and government sectors.
Steve Castillo *Forester*	B.S. Forest Management Oregon State University	U.S. Forest Service (1977-1992). BLM (1992-present). Current duties: All aspects of forest management with emphasis on ecosystem restoration, hazardous fuels treatment, and small diameter timber harvest.
Mollie Chaudet *Project Manager, Upper Deschutes RMP*	A.S., Forest Technology Central Oregon Community College.	Twenty years of experience with the Forest Service. Environmental Coordinator and National Environmental Analysis Instructor, 1990-present; Project Planner, 1982-1989. Timber Sale Preparation 1978-1981.
Lisa Clark *Writer/Editor*	M.F.S. Conservation Biology/ Wildlife Ecology. Yale University. B.A. Journalism, minor: English University of Oregon.	13 years with BLM, in Fire Suppression/Rx Burning, Wildlife, Recreation, and Writing/Editing. Three years with the Forest Service as wildlife biologist and writer/editor. Other experience includes Adjunct Instructor, Univ. of Oregon, General Science Program (2000 - present).
G. Scott Currie *Recreation Planner*	M.L.A Landscape Architecture, Cal Poly Pomona B.S. Natural Resource Management, Cal Poly San Luis Obispo	Recreation planner for Prineville District BLM 1999 – present. 10 years experience as Landscape Architect/Recreation Planner with USFS and USDA-NRCS. 10 years experience as Landscape Architect/Recreation Planner with EDAW.
William I. Dean *Wildlife Biologist*	B.S. Wildlife Biology, Colorado State University Associate in Science, Finger Lakes Community College	Bureau of Land Management (1990-2003) Currently wildlife biologist for the Deschutes Resource Area.
Jimmy Eisner *Fisheries Biologist*	B.S. Fisheries, Humboldt State University	Fish Biologist for Prineville District BLM 1991 – present.
Ryan Franklin *Physical Science Technician*	B.S. Geology, University of Oregon	Seasonal wilderness ranger (1995-1996) and seasonal hydrological technician (1997) for the USFS. Seasonal interpretive ranger (2001) for the BLM. Currently a seasonal physical science technician for the BLM. Duties include minerals planning and inventory of rock collecting sites.
Ron Gregory *Deschutes Resource Area Archaeologist*	B.A. and M.A./Applied Anthropology. Oregon State University	Positions held as archaeologist with the USFS and BLM with responsibilities for locating, researching, and documenting historic properties and heritage resources and planning for their preservation and appropriate uses.
Ron Halvorson *Natural Resource Specialist – Botanist*	B.S. Animal Science, Cal Poly San Luis Obispo; M.S. Renewable Resources Management, University of Nevada, Reno	Range Conservationist BLM (1974 - 1984), District Botanist Prineville District BLM (1985 - present). Responsible for implementation of special status plant and Research Natural Area programs, and policy oversight of Area of Critical Environmental Concern program.

Table 5-4. Interdisciplinary Team for Upper Deschutes Resource Management Plan

Name and Title	Education	Experience
Douglas D Kile *GIS Coordinator UDRMP/ Deschutes Resource Area*	Various classed taken in quarter during the 1990s from Eastern Oregon and Central Oregon Community College. Associates Degree in Drafting (1982) from Treasure Valley CC	Coordinate and provide GIS analysis and cartographic needs for issue teams and resource area specialists. Previously employed as GIS assistant on the Prairie City Ranger District and Malheur National Forest Supervisors Office.
Michelle McSwain *Hydrologist*	Masters in Forest Hydrology-OSU/BA in Geology-University of Wisconsin-Madison	District hydrologist for Vale District BLM 1987-1989; Zone Hydrologist for Willamette National Forest 1989-1997; Hydrologist for Prineville District BLM 1997-present. Duties include district watershed program lead, water quality, riparian, stream channel, and aquatic habitat management.
Phil Paterno *Appraiser/Realty Specialist*	B.S. Plant and Soil Science State Certified General Appraiser	Duties include the valuation of land and interests, and the processing of land exchanges, acquisitions, sales and other realty related cases.
Teal Purrington *Rangeland Management Specialist*	M.S. Rangeland Resources, Oregon State University B.A. Biology, University of California, Santa Cruz	In current job since 1991. Duties include managing livestock grazing and providing input on management of other public land uses to preserve and enhance forage and other rangeland resources.
Sue Stewart *Fire Ecologist*	M.S. Natural Resource Management, Fire Ecology, University of Idaho. B.S. Forest Management, Oregon State University.	Various Fire Mgmt positions with US Forest Service and BLM since 1987. Currently Fire Ecologist for Prineville BLM and Deschutes and Ochoco National Forests. Duties include broad scale planning and monitoring of fuels management activities.
Lawrence C Thomas *Environmental Protection Specialist*	B.S Soil Science and Biology (Cal Poly Pomoma)	Soil Scientist USDI BIA 1975-1977, Soil Scientist USDI BLM 1977-1992, Environmental Protection Specialist USDI BLM 1992 to present.
Michael Williams *Writer/Editor*	BA, MA, PhD., Sociology. University of California, Santa Barbara	Assistant Professor of Sociology, University of Southern Maine 1976-1980, NPS Ranger, 1981-1990, Writer Editor, USFS/BLM, 1992 to present.
Ron Wortman *Realty Specialist*	B.S. Business and Cartography, Eastern Oregon College	Realty Specialist for Prineville District for nine years. Duties include preparation of sales, exchanges, recreation and public purposes applications, rights-of-way, and leases and permits.

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