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# Chapter 4

## Environmental Consequences





# Introduction

In accordance with NEPA, this chapter describes the direct, indirect, and cumulative environmental consequences of the land management alternatives described in Chapter 2 on the affected environment described in Chapter 3. The following environmental consequences are described by resource or resource use. Key indicators are used to assess the direct and indirect effects of management alternatives and are described for each resource or resource use. Assumptions common to all analyses are described first; assumptions that are more specific are described in the following sections.

## Summary of Changes between Draft and Final

Each resource evaluated the effects of changes to the alternatives. Figures and conclusions were updated where there were substantive changes or discussion was necessary based on the type and amount of effects determination changes. The Summary of Changes in Chapter 2 (proposed actions) can be used as a guide for where effects analysis has been updated. Additional effects discussion has been added relative to OHV noise-related issues, carbon storage, greenhouse gas emission, and the effects of proposed actions on Lands and Realty. In the Draft, cumulative effects were included under the heading of Other Effects. This has been changed to Cumulative Effects, and a summary of reasonably foreseeable actions is contained at the beginning of this chapter.

## Analytical Assumptions

The following key assumptions are common to all alternatives.

### Planning Time Horizon

The environmental and social effects of resource management or resource use extend across long and short term planning horizons. For the purposes of these analyses, “long term” is considered to be about 50-100 years, and “short term” is considered to be about 10-30 years. “Temporary” is considered to be less than 5 years and preferably less than 2 years.

### BLM Budget

It is assumed that all alternatives would be adequately funded to implement them as designed and described in Chapter 2. However, some effects analysis utilizes historic activity levels as a constant for comparing alternatives.

### Threatened and Endangered Species

It is assumed that the current listing status for species under the Endangered Species Act would remain in effect. Additionally, since BLM manages candidate species similar to listed species (to avoid contributing to the need to list them), then any future listing would have little measurable effect on the BLM’s management approach. Analysis of RMP impacts on a particular species would remain relevant or conservative regardless of any future listing or delisting action.

### Natural Disturbances

This analysis does not include estimates of future natural disturbances except in the case of potential future stand replacement wildfire disturbance, in some instances. It is assumed that wildfires, windstorms, disease, insect infestations, and subsequent resource salvaging would occur in the future under all five alternatives. Although the alternatives may result in differences in the landscape effects of natural disturbances, the specific location, timing, severity, and extent of such disturbances are not predictable at the scale of the plan area.

## Data, Methods, and Models

Assessments of the effects of the alternatives are both quantitative and qualitative in nature, and they consist of procedures, models, or information from professional sources.

A Geographic Information System (GIS) database was used to analyze the environmental consequences of the alternatives. This database includes information on such things as vegetation, management units, roads, hydrology, soils, elevation, ownership, wildlife habitat, energy, minerals, and noxious weeds. The GIS data provides the locations of the important features and their attributes that relate to the lands and the relevant decisions of this planning effort. The John Day River Basin Resource Management Plan ID Team worked with a team of GIS specialists to create a spreadsheet that recorded both geospatial data and analytical requirements. Based on defined requirements, the relevant geospatial data was reviewed, updated and organized, much of which has been placed into a central geospatial database. Metadata for each theme was created. Metadata is information that explains the source, history, attributes and individuals responsible for each of the data used in the PRMP/FEIS. The database was used by GIS analysts in the BLM Prineville District, as well as in the BLM Oregon State Office in Portland. The data was used to create the analyses and the maps in the PRMP/FEIS. The GIS team automated the geospatial analytical processes and generated the acreage summaries by resources issues, alternatives and category. The Bureau is a member of the Department-wide site license for ESRI's GeoProcessor software, and ArcMap version 9.2 was used to complete the analyses. This data is available to the public upon request.

The Water Erosion Prediction Project (WEPP) model is a computer program that describes the processes that lead to erosion. A subset of this model (the WEPP Forest Road Erosion Predictor) was used to estimate erosion and sediment delivery from the JDB RMP plan area road network. Model input parameters include road design, road surface, traffic level, road gradient, road length, road width, fill gradient, fill length, buffer gradient, buffer length, rock fragment percent, soil texture, and climate. These input factors were estimated for each segment of road, and the model was run for 30 years using a climate representative of the road segment area. Outputs for each road segment include the average annual sediment leaving a road segment and average sediment leaving a buffer. The sediment outputs were summarized and totaled by road designation and stream crossings. These summaries were used for comparing alternatives.

Road banding was used to analyze the effects of roads on wildlife habitat. The methodology utilized Arc GIS 9.2 to buffer open roads by six concentric distances of 394 yards each. Resultant buffers formed bands of varying distances from open roads: band 1 = zero to 394 yards; band 2 = 395 to 788 yards; band 3 = 789 to 1,182 yards; band 4 = 1,183 to 1,576 yards; band 5 = 1,577 to 1,970 yards; and band 6 = 1,971 to 2,364 yards.

### Incomplete or Unavailable Information

The Council on Environmental Quality (CEQ) requires that a Federal agency identify relevant information that may be incomplete or unavailable for an evaluation of reasonably foreseeable significant adverse effects in an EIS (40 CFR 1502.22). If the information is essential to a reasonable choice among alternatives, it must be included or addressed in an EIS. Knowledge and information is, and would always be, incomplete, particularly with infinitely complex ecosystems considered at various scales.

The best available information pertinent to the decisions to be made was used in developing the RMP/EIS. Considerable effort was taken to acquire and convert resource data into the most useful format for the analyses conducted.

Certain information was unavailable for use in developing this plan. In the absence of quantitative data, impacts are described based on the professional judgment of the interdisciplinary team of technical specialists using best available information. Impact analysis based on incomplete or unavailable information is identified below; however, no incomplete or unavailable information was deemed essential to reasoned choice among the alternatives analyzed in this chapter.

- Although global and national estimates of climate change are available, regional and state-specific estimates and quantification techniques are in varying levels of development.

- Analytical tools necessary to quantify specific effects of human activities on climate are presently unavailable. Therefore, the alternatives present a comparative analysis of the production of gases believed to affect climate and put these emissions in context with state and national emissions.
- The uncertainty regarding regional changes in climate also means that it is not currently possible to predict the specific effects of climate change on resources within the planning area. Regardless of the eventual change in climate, the effects would be largely the same in all alternatives, so a comparative analysis of effects of climate change on resources would not help the BLM decision-maker choose between alternatives.
- Route inventories have not been completed for the entire planning area (see Travel Management section of Chapter 3 for a detailed account of the status of this inventory).
- A detailed forest health management plan (logging systems, transportation, etc.) has not been developed for the North Fork acquired lands.
- Inventories for all special status plants and animals are incomplete for the planning area.
- No data exist that quantify existing soil bulk density in areas of past treatments or soil processes other than erosion potential, including soil nutrient and water cycling in the planning area.
- Inventories for noxious weeds are incomplete for the planning area.
- Times and level of noise experienced within or at residences adjacent to LCM from off-highway vehicle use within the LCM Special Recreation Management Area; or the potential effects physically or psychologically of that noise on residents.

## Social and Economic Analysis Methods and Issues

Social and economic analyses included in the PRMP/FEIS consist of eight central Oregon counties: Gilliam, Grant, Jefferson, Morrow, Sherman, Umatilla, Wasco, and Wheeler.

Potential economic impacts were assessed using the Forest Economic Analysis Spreadsheet Tool (FEAST) developed by the USDA Forest Service Inventory and Monitoring Institute (IMI) in Fort Collins, Colorado. This tool uses a Microsoft Excel workbook as an interface between user inputs and data generated using the IMPLAN input-output modeling system. For additional information on social and economic analysis methods, see Appendix R.

Biomass opportunities may exist, but are not analyzed given a lack of understanding of obstacles to implementation and impracticalities of projecting future scenarios for implementation. Potential impacts on non-market values, including natural amenities and quality of life, non-use values, and ecosystem services, are assessed in qualitative terms as appropriate.

## Cumulative Effects

Cumulative effects result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). Some environmental effects described in this environmental impact statement have incremental impacts that result in cumulative effects on a particular resource of concern. The discussion of effects on each resource in this chapter incorporates cumulative effects. Baseline information on existing conditions is the aggregate result of all past actions and previous land use plans (as described in Chapter 3); therefore, this chapter does not individually analyze these past actions.

For the National system of public lands, reasonably foreseeable future actions are those that would occur under current or proposed land use plans and that the Responsible Official of ordinary prudence would take into account. For private lands, reasonably foreseeable future actions are those actions that would occur with the continuation of present management at current trends or those allowable under state and local laws and regulations that the Responsible Official of ordinary prudence would take into account.

## Reasonably Foreseeable Future Actions Considered in Assessing Cumulative Effects

For purposes of this analysis, it is assumed that other federal and state agencies would continue to implement their current plans as written. Since private, industrial, and non-industrial lands are owned by a variety of individuals and entities, the BLM did not attempt to predict the various scenarios that could occur on adjacent lands across space and time. It is assumed that private lands would continue to provide the same overall amount and spatial pattern of vegetation, habitat and disturbance over time as presently exists.

Future management on BLM, Forest Service, State, private, and other land is assumed to be very similar to current management. The Forest Service Schedule of Proposed Actions (SOPA) is indicative of the types of management actions that are likely to continue into the future throughout the planning area. The majority of vegetative treatments include thinning from below, underburning, small forest products (post, poles, and firewood), salvage, hazard tree removal, noxious weed treatment and juniper reduction. The majority of forest lands in the plan area are administered by the Forest Service (Ochoco, Malheur, and Umatilla National Forests). Vegetation management direction for the Forest Service is very similar to BLM. The trend for forested vegetation would be the reduction of sapling to small log size material generally from the understory.

Private land treatments are similar; however, more of the large structure trees are removed. Private land managers will in general continue to recover the value of dead and dying timber consumed in wildfires.

The Forest Service is currently or will soon update their forest plans for the Umatilla, Wallowa-Whitman, Malheur, and Ochoco National Forests, which are the adjacent forests to this planning area. This will afford an opportunity to address issues similar to those addressed in this BLM plan. Forest Service plans are not likely to propose radical adjustments from current land management (except for complying with updated travel management regulations), but are likely to add flexibility and resource protection. The updated travel management plans will include limits to most OHV use to designated routes. Additional resource protection may include phasing out some grazing allotments.

The Forest Service will analyze existing and proposed mining plans of operations for active mining operations, such as those within the Lower Granite Creek Watershed. Land managers will continue to close abandoned mines by filling in adits (see glossary), trenches, and shafts with earth and rock from existing mine spoil piles and re-contouring slopes adjacent to work area.

Forest Service plans may establish special management areas or zones with specific resource or use emphasis. For example, current Forest Service plans established Research Natural Areas, such as the Shake Table plateau between Murderer's Creek and South Fork Murderer's Creek. Aquatic restoration planning and implementation by the Forest Service and other Designated Management Agencies (DMAs) are likely to result in at least minor improvements of all the indicators of aquatic condition and protection of the source water and domestic water supplies.

Assuming that national trends in the migratory patterns of retirees to the inland Northwest continue, private lands are likely to become sub-divided into smaller parcels for retirement homes and recreation uses. Road-stream crossings and watershed cover changes are likely to increase with increased population and recreation uses.

Planning area land managers generally share the objective of reducing ladder fuels to help reduce the potential for crown fires. This includes thinning and using prescribed fire to reduce potential for stand-replacing fires. Forest managers will conduct small tree thinning; underburning; hand piling and lopping of slash to reduce fuels; removal of hazard trees; and recovery of the value of dead and dying timber damaged by wildfires. Thinning of overstocked stands of ponderosa pine and Douglas-fir is proposed to improve stand health and vigor. Many thinnings will be done from the understory, with the largest and most vigorous trees left after thinning.

The amount of forest health treatments on non-BLM lands is largely dependent on global fluctuations of social, economic and environmental demands.

## Mitigation

The Council of Environmental Quality's regulations state that mitigation includes avoiding, minimizing, rectifying, reducing, eliminating, or compensating for adverse environmental impacts. Measures used in mitigating effects from management activities are included in the design of the alternatives, and therefore assessed as part of the effects of alternatives.

## Summary of Environmental Consequences

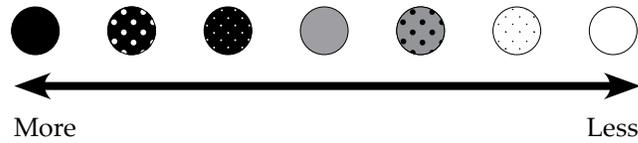
Table 4-1 synthesizes environmental consequences (including social, economic, and ecological) by resource or resource use. It qualitatively compares how the alternatives meet the long-term goal of developing management practices that ensure long-term sustainability of a healthy and productive landscape, and add to community stability through resource use and enjoyment, as described in Chapter 1.

Tables 2-24 and 4-1 display the overall key effects between alternatives. Relative rankings in Table 4-1 are based on the comparative net differences in effects of the management alternatives on each specified resource or resource use. Some effects of alternative actions meet the purpose and need to varying degrees. These differences add-up to an overall net effect. For example, reducing social and ecological conflicts between livestock grazing and other uses could result in an economic effect due to lower availability of AUMs if allotments must be closed as a result. Similarly, increasing the amount of transportation system roads could increase public access to BLM lands, but could also increase road maintenance. Table 4-1 displays net effects of the alternatives considering these differences. Examples of indicators that differ in their outcomes across alternatives are also displayed. Detailed analyses of effects are described later in this chapter.

It is difficult to address all needs across a broad range of resource values and land uses. Each of the alternatives involves compromise; however, Alternative 2 is preferred over the other alternatives because overall, it best meets the purpose and need for a revised plan, as described in Chapter 1. Alternative 2 is as good as, or better than other alternatives at addressing resource issues. The possible exception is recreation, where the availability of off-road vehicle travel routes is greater in Alternative 3.

**Table 4-1. Synthesis of Environmental Consequences (Including Social, Economic, and Ecological) of Management Alternatives on Resources and Resource Uses in the John Day River Basin Plan Area.**

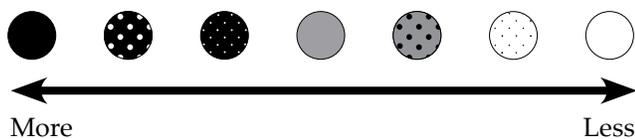
To what relative degree do the alternatives meet the purpose and need, significant issues, and management concerns, as described in Chapter 1?



<b>Issue 1: Landscape Health.</b>		<b>Alternative</b>				
<b>Resource or Resource Use</b>	<b>Examples of indicators that show differences in effects between alternatives.*</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
		<p>Would the plan achieve healthy plant and animal communities? Would the plan allow fire to play its ecological role while helping to ensure public safety from wildfire?</p>				
Vegetation	Difference between current ecosystem conditions and the Acceptable Range of Variability (ARV).					
Fire and Fuels	Wildfire risk to communities at the wildland urban interface.					
Aquatic Resources	Difference between current and proper functioning conditions.					
Wildlife	Security habitat.					
<p><b>Issue 2: Access and Travel Management.</b></p> <p>Would the plan result in a road system that would efficiently deliver goods, people, and services across the plan area? Would the plan provide for motorized and non-motorized recreation, while protecting natural and cultural resources?</p>						
Access and Travel	Access to public lands. Road maintenance costs.					
Recreation	Availability of OHV routes and Open areas. Conflicts between OHV and other uses.					

**Table 4-1 (continued). Synthesis of environmental Consequences (Including Social, Economic, and Ecological) of Management Alternatives on Resources and resource Uses in the John Day Basin Plan Area.**

To what relative degree do the alternatives meet the purpose and need, significant issues, and management concerns, as described in Chapter 1?



<b>Issue 3: North Fork of the John Day River</b>						
Does the plan protect native fish, wildlife habitat, and public recreation on newly acquired and adjacent BLM lands along the North Fork John Day River?						
Resource or Resource Use	Examples of indicators that show differences in effects between alternatives.*	Alternative				
		1	2	3	4	5
Wild and Scenic Rivers	Outstandingly Remarkable Values (ORVs).					
<b>Other Management Concerns*</b>						
Social and Economic Values	Employment and labor income.					
Soils	Erosion.					
Wilderness Characteristics	Maintenance of wilderness qualities.					
Wilderness Study Areas	Degree of protection of wilderness values.					
Visual Resources	Visual quality.					
Caves	Degree of habitat protection.					
Livestock Grazing	Available AUMs in areas of high use or ecological values.					
* Management of the following concerns vary none or little in their effects across alternatives: Air Quality, Noxious Weeds, Wild Horses, Areas of Critical Environmental Concern, Back Country Byways, Native American Values, Paleontology, Cultural Values, Lands and Realty, Agriculture Lands Management, and Minerals and Energy.						

## Resource Uses Not Affected by the Alternatives

The following resource uses are not anticipated to be appreciably affected by alternatives for other resources or resource uses: Areas of Critical Environmental Concern, Back Country Byways, Lands and Realty, Agricultural Land Management, and Hazardous Materials Management. However, the environmental consequences of these resource uses on other resources are analyzed in the following section.

# Analyses of Environmental Consequences by Resource or Resource Use

## Soils

Analysis of the environmental consequences of the alternatives on soils considered the following key resources or resource uses: Vegetation (manipulation), Fire and Fuels, Wildlife, Livestock Grazing, Recreation Opportunities (motorized and non-motorized recreation), Travel Management, and Energy and Minerals.

Indicators used to compare environmental consequences between alternatives include: acres of treatments with potential to detrimentally damage soils, soil erosion [e.g., tons of soil eroding using Water Erosion Prediction Project (WEPP) road model outputs], acres of sensitive soils, and acres treated on sensitive soils.

## Soil Indicators

- **Area (acres) of treatments with potential to detrimentally damage soils.** A detrimentally impacted soil will likely not recover to a native perennial vegetation cover within 2 years following an impact disturbance.
- **Acres of surface-disturbing activities and treatments on sensitive soils.** Ground disturbance on soils highly vulnerable to erosion can be more detrimental in a shorter period of time than in areas identified as moderately or not vulnerable to erosion.
- **Soil erosion (tons of soil eroded).** Soil erosion is the displacement of soil from the earth's surface. Some rates of soil erosion are part of landscape evolution. Soil erosion referenced in this document is at rates and scales beyond those associated with natural soil erosion. Compacted or displaced soils are more susceptible to erosion.
- **Soil productivity.** Soil productivity is the ability of soil to grow plants. Soil productivity is an indicator of how well management would attain land use plan objectives for soils. Coarse wood in forest and woodland sites is essential to long-term carbon storage and soil productivity. Healthy stands of native bunch grass are good for maintaining and replenishing organic matter necessary for rangeland soil productivity.
- **Soil function.** Soil function is the capacity of soil to: (1) sustain life, diversity, and productivity; (2) regulate and partition water and solute flow; (3) filter, buffer, degrade, and detoxify potential pollutants; and (4) store and cycle nutrients. Soil function is reduced in compacted soils. Reduced soil function in compacted soils is related to reduced pore space, less biologic activity, increased water runoff, and loss of organic material. Macrobiotic crusts store and cycle nutrients in soil.

## Soil Assumptions

- Under extreme weather conditions, wildfires will burn heavy coarse fuel loads (tree canopy cover greater than 40%) hot enough to detrimentally impact the soil (USGS 2007).
- The longer an area is in a detrimentally impacted condition without protective soil cover, the greater the potential for increased erosion, loss of soil productivity, and decreased soil function.
- Open OHV designations with high intensity use will decrease soil productivity and long-term soil function.
- The additive effect of repeated treatments on a forested site can compact soils.
- All alternatives will implement soil BMPs.
- Relative to soil function, sites in early seral condition are generally in 'poor' ecological condition and prone to invasion from weeds and annual grasses. Late seral condition sites are generally in 'good' ecological condition and are not currently prone to invasion from weeds and annual grasses. Mid-seral condition sites fall in between.

## Analysis of the Effects of the Alternatives on Soils

The analyses described herein are focused on actions of potential measurable environmental consequence. The following resources or resource uses under all alternatives would either have no difference in effects on soil resources, or effects would be eliminated by the use of Best Management Practices for: Air Quality, Vegetation (special status plants), Lands with Wilderness Characteristics, Cave Resources, Native American Uses, Paleontological Resources, Special Designations (wild and scenic rivers), and Lands and Realty (including Renewable Energy).

### Soils Management Effects on Soils

Soil restoration actions include seeding, planting, subsoiling, lopping and scattering of cut vegetation, and other actions. Applying restoration treatments improves vegetative soil cover, increases biologic activity in soil, decompacts soils, and restores soil function. Soil restoration actions in upland areas ensure a less than 10% probability of unnatural soil erosion. Alternative 1 and Alternatives 2-5 prescribe actions to limit erosive conditions, but only Alternatives 2-5 prescribe actions to restore soil productivity and soil function. All alternatives would conserve soil productivity and function by avoiding disturbance that requires restoration.

Guidelines provide specific limits and criteria for soil management. Guidelines under Alternatives 2-5 provide limits to and restore areas of detrimental soil impacts, retain large wood, and prescribe grazing that increases biological soil activity. These actions reduce the amount of detrimentally impacted soils, contribute organic matter for soil function, and improve soil productivity, respectively. There are no guidelines for the amount of detrimental soil impact, large wood retained, or grazing prescriptions under Alternative 1. Therefore, soil management under Alternatives 2-5 would improve overall soil function more than Alternative 1.

Some soil guidelines provide limits and criteria specific to soils near facilities. Implementing, maintaining and restoring proper drainage and erosion control on all existing facilities reduces erosion from and around those facilities. Trading the expansion of soil disturbance area associated with new facilities for proportional rehabilitation, decommissioning, or obliteration of other disturbed areas maintains a constant area of soil disturbed by facilities (e.g., roads, trails, campsites, and landings). The existing area of soils disturbed by facilities would be reduced or maintained through trades. Requiring a change in road maintenance intensity to a level where excess erosion is verified and controlled systematically would eliminate excess erosion (6-inch ruts) across the entire road network. Management of soils near facilities would result in less erosion and less area disturbed by facilities under Alternatives 2-5 than Alternative 1.

Best Management Practices for soils would minimize erosion initiated by other resources or resource uses. The amount of erosion reduced by the utilization and effect of Best Management Practices would be approximately the same under Alternative 1 and Alternatives 2-5.

### Non-Motorized Recreation Effects on Soils

Recreation management of the plan area is divided into Primitive, Back Country, Middle Country, Front Country, Rural and Urban settings. Non-motorized recreation is emphasized in Primitive and Back Country settings, but is available under all recreation settings. Non-motorized activities include hiking, mountain biking, horseback riding, hunting, camping and similar uses. Non-motorized activities can occur on designated sites or may be dispersed across the landscape.

Public use at designated sites often removes vegetative soil cover and compacts the soil surface (Beardsley and Wagar 1971; Cull *et al.* 1981). Losses of soil cover decreases soil productivity and may increase erosion. Compaction of soils also decreases soil function. In this plan, designated sites for hiking, camping and mountain biking would generate detrimental soil impacts that are similar for all action alternatives.

The desire for non-motorized recreation, other than river rafting, is very light in the plan area. As a result, there are very few designated sites for non-motorized recreation. All alternatives continue the designated camp sites along the river corridors and on designated trails. The action alternatives include proposals for new developed sites in Dixie Creek and the North Fork John Day River. The Dixie Creek area would include an emphasis on a mountain bike trail network that would be prone to erosion and compaction. Designated campgrounds proposed

for the North Fork John Day would shift camping away from the river. This shift would reduce compaction and erosion of the riparian soils along the river. Subsequent erosion and compaction at the developed camp sites would be minimized through the use of BMPs. Prudent monitoring and on-site enforcement of the proposed campgrounds and mountain bike trails would minimize erosion and compaction associated with these activities.

Guidelines for trading expansion of new developed sites with proportional rehabilitation, decommissioning, or obliteration of existing disturbed areas would maintain or decrease current acres disturbed across all alternatives.

Under all alternatives, most non-motorized recreation opportunities would continue to be dominated by dispersed use and cause limited compaction and erosion. Dispersed recreation may create scattered trails. Trails that occur on steep slopes or concentrate use over a large area could lead to soil compaction and erosion. Sediment eroded from trails is often deposited directly into small streams. This excess sediment may increase erosion and transport rates of alluvial soils and cause gullies along small streams. However, across the plan area, the non-motorized recreation is light. This light level is expected to continue and result in minimal erosion under all alternatives.

### **Motorized Recreation Effects on Soils**

Motorized recreation is part of the recreation setting in the portions of the plan area allocated as Middle Country, Font Country, Rural, and Urban. Approximately 80% of the plan area is available for motorized recreation under Alternatives 2-5, and approximately 85% of the plan area is available under Alternative 1, based on OHV designations of Open and Limited.

Motorized recreation includes the use of several types of off-highway vehicles (OHVs) such as: motorcycles, "quads," and full-sized 4-wheel drive and passenger vehicles. These OHVs have some effects on soils that are slightly different than highway travel. With OHVs, speed is often a factor. Also, OHV use often entails spinning wheels, high speed turns, hard acceleration, hill climbing, and travel. When this use occurs on very wet or very dry unimproved trails or native soils, it can cause accelerated erosion and also soil displacement and compaction. With increased motorized recreational activity, the acres of surface-disturbing activities, erosion and compaction would increase while soil productivity and biological soil activity would decline. The use of OHVs is allowed in areas designated as either Open or Limited to designated roads and trails. In Closed areas, OHV use is prohibited, except for limited administrative use.

Areas designated as Open for OHV use allow cross-country travel without use restrictions. Over time, repeated use of cross-country paths by motorized recreationists and travelers, particularly near population centers, results in the creation of roads/trails on public and private lands. Cross-country OHV use spreads weeds that may alter soil characteristics such as fire regimes, biologic community, and soil production. Even light soil surface disturbance from OHV use can disrupt growth of macrobiotic crusts that are important for nutrient processing and soil function. Alterations in soil characteristics can decrease soil productivity.

All these possible effects to soils would exist and continue under alternatives that designate Little Canyon Mountain for OHV use. Alternative 1 for the Little Canyon Mountain Special Recreation Management Area presently allows for unlimited cross country OHV travel. This permits OHVs to travel in any area regardless of sensitive soil designation. All of the action alternatives restrict OHV travel to the pit areas and to designated routes only. The pit areas were hydrologically mined in the past and have historically had heavy OHV use resulting in detrimentally disturbed soil conditions. The pit areas are located in confined areas and do not allow displaced sediment to move offsite. OHV use outside of the pit areas would be on designated trails designed to minimize soil disturbance impacts. While soil conditions would not improve in the pits areas under the Open designation for the action alternatives, confining open OHV travel to the pit areas and designated routes would minimize soil disturbance in the remainder of the Little Canyon Mountain Special Management Area. Soil objectives will be made consistent with direction in Executive Order 1161 for the action alternatives, after the existing detrimentally disturbed non designated OHV tracks are closed, stabilized, rehabilitated, and enforced with specific actions in the implementation plan for that area.

Alternative 1 designates more than half the BLM lands Open for OHV use. Only Wilderness Study Areas or other special management use areas are not designated as Open. Alternatives 2 and 3 designate Open OHV use on less than 1% of the BLM lands. Alternatives 4 and 5 contain the least amount of Open OHV use. Therefore, accelerated

erosion, compaction, soil displacement, and loss of soil function due to Open OHV use varies from greatest under Alternative 1, much less under Alternatives 2 and 3, and least under Alternatives 4 and 5.

Areas designated as limited to roads and trails identify paths for various types of uses. In general, motorized use paths remove vegetative soil cover, weaken macrobiotic crusts, and compact soils. This loss of cover increases erosion and the compaction decreases soil function. Closure and rehabilitation of hill climbs and paths with gullies reduce erosion and improve soil function. In general, motorized use paths and the subsequent loss of soils function are greatest under Alternative 3, less under Alternative 1, and least under Alternatives 2, 4, and 5.

The use of BMPs when designating and designing the trail system under the Limited OHV designation reduces the amount of erosion and compaction that would occur under user-created trails. Improved trail design encourages compliance by providing a desirable riding experience. This reduces the probability that a user-created trail would result in detrimental soil impacts. Directional signs and numbering of major roads/trails encourage users to stay on designated routes and help them to navigate more efficiently. Monitoring and enforcement of trail systems improves compliance and reduces off trail use. Compliance with use of designated trails and use of BMPs is essential for minimizing erosion and loss of soil function from poorly designed trails. Alternative 1 does not contain standards for OHV trail design, desirable routing or designation criteria. Under Alternatives 2-5, designated trails are selected to meet Soils objectives, are designed with soils BMPs, and provide an efficient and desirable riding experience. As a result, the erosion, compaction and area of detrimental soil impact from Limited OHV designations would be much less under Alternatives 2-5 than Alternative 1.

The OHV numbers and pressure for their use is increasing throughout the plan area. There is more OHV pressure around population centers. Considering all of the fuels and vegetation treatment needs, new routes created by thinning woodlands could create new opportunities for OHV travel off planned designated routes creating possible new unintended erosion and sedimentation effects. Increased compaction from ground based vegetation treatments would add intensity to flashy runoff into drainages further destabilizing riparian communities.

Due to the combination of OHV closures proposed by the Forest Service in adjacent lands in the plan area, closures on private lands, and BLM closures in the action alternatives, cross-country OHV users may concentrate their use in the small designated Open areas proposed under specific alternatives (Rudio Mountain, Golden Triangle, and Little Canyon Mountain). By concentrating use, soil productivity loss in those areas may be greater than under either the broad Open areas of Alternative 1 or the mostly Limited designations of the action alternatives. However, providing designated Open areas under the action alternatives may improve compliance with designated trail systems, thereby maintaining or improving soil productivity across the remainder of the plan area.

### **Little Canyon Mountain OHV Soil Impacts**

According to the soil erosion vulnerability map (Map 3, Chapter 2), 7 percent of the Little Canyon Mountain OHV area is not vulnerable to erosion, 62 percent is highly vulnerable to erosion, 29 percent is moderately vulnerable to erosion, and 2 percent is moderately vulnerable to loss of soil productivity due to soil depth. About 38 percent of the 16 miles of existing road network in LCM has a high erosion probability. In all of the alternatives with limited OHV use it is important to monitor the trail use and erosion potential for the areas identified as highly vulnerable to erosion or on the road network with a high erosion probability as identified (Map 25, Chapter 4). The use of BMPs for trail construction and maintenance for these areas is also critical. For Alternative 5, all of the LCM area is closed to motorized OHV use. So Alternative 5 is the least impacting for detrimental soil impacts from OHV use. Alternative 1 or the existing condition has all of the LCM area open to motorized OHV use so Alternative 1 is most impacting to soils from OHV use. Alternatives 2 and 3 limit use to designated trails. Alternative 2 limits type of motorized use in both pits, while Alternative 3 limits type of motorized use in the lower pit (North Pit) and leaves the upper pit (South Pit) open. Both alternatives allow the designated type of motorized vehicle to use the pits without restrictions so impacts would be similar between alternatives 2 and 3, and intermediate in impact from the previous two alternatives. Alternative 4 differs from Alternatives 2 and 3 by having the lower pit (North Pit) closed to all OHV use and the upper pit (South Pit) Open to all OHV use. Both LCM pit areas are about 2 acres each in size and would comprise less than 0.1 percent of the total LCM area. According to the soil erosion vulnerability map (Chapter 2, Map 3) the lower pit (North Pit) has 75 percent of its area identified as moderately vulnerable to erosion, 21 percent as not vulnerable to erosion, and 3 percent as highly vulnerable to erosion. The upper pit has 26 percent of its area identified as moderately vulnerable erosion and 74 percent as not vulnerable

to erosion. The upper pit is better from a soil erosion standpoint but may have less relief for OHV recreation opportunities. Closing the loser pit, which is more susceptible to erosion, makes Alternative 4 less impacting than Alternatives 2 and 3. For all the alternatives, rutting hazard is greatest after snow melt in the early spring when soils are saturated or during intense precipitation events during the summer and fall when soils are not frozen.

### **Rudio Mountain OHV Soil Impacts**

According to the soil erosion vulnerability map (Map 3, Chapter 2), 42 percent of the Rudio OHV area is not vulnerable to erosion, 19 percent is moderately vulnerable to erosion, and 39 percent is moderately vulnerable to loss of soil productivity due to soil depth. Less than 1 percent of the Rudio OHV area is highly vulnerable to erosion. According to the road erosion probability map (Map 25, Chapter 4), about 5 percent of the 18 miles of existing road network in the Rudio OHV area has a high erosion probability. Alternative 1 (the existing condition) and Alternatives 2 and 3 have all of the Rudio OHV area open to motorized OHV use. Alternative 4 has 44 percent of the northwestern area closed to OHV use. The remaining 56 percent of the southern and eastern areas are identified with a "Limited" classification, which means limited to existing trails. Therefore, Alternative 4 is least impacting to detrimental soil impacts and Alternatives 1, 2, and 3 are the most impacting to soils from OHV use. Alternative 5 has a "Limited" to existing trails designation, which puts it in the middle for detrimental soil impacts of all the alternatives. For the alternatives with the open designations, if detrimental soil impacts exceed 15 percent, OHV use should be re-evaluated for the area. For Alternative 5, it is important to monitor the trail use and erosion potential for the areas identified as highly vulnerable to erosion or on the road network with a high erosion probability as identified (Map 25, Chapter 4). For all alternatives, rutting hazard is greatest after snow melt in the spring when soils are saturated or during intense precipitation events in the summer and fall when soils are not frozen.

A form of recreation that is becoming more common in isolated spots of the plan area is Class II motorized rock crawling. Rock crawling occurs on bedrock, where there is little soil. The lichens and moss growing on the rock, and plants growing out of cracks in the rock could be eliminated, especially with increased use. The soils at the base of a climb, staging areas, flat benches or summits would be affected similar to the soils affected by transportation management. Areas open to rock crawling are much greater in Alternative 1 than Alternatives 2-5. Alternatives 2-5 simply designate the isolated areas that are already being used for rock crawling. Therefore, there are very few differences between the alternatives in this aspect.

### **Transportation Management Effects on Soils**

The transportation system has two basic effects on the soil resource. First, it takes land out of vegetation production. Once a road has been constructed, the site has lost much of its soil productivity (potential to grow vegetation). The cut-slopes and road tread lose potential to grow vegetation due to loss of topsoil and compaction respectively, while fill slopes retain some potential for reestablishing vegetation cover. The second effect is the impact of the road on erosion over time. Roads are major collectors and funnels of water. Rock-surfaced roads produce little sediment over time and are easily maintained. Well designed rock-surfaced roads tend to produce less sediment than natural surfaced roads or paved roads. Paved surface roads erode very little from their paved surface, but the smooth paved surface increases water velocities, which erode soils from the ditches and road shoulders. Natural surfaced roads composed of native soil material are responsible for most of the sediment that leaves the road system. Under all alternatives, the majority of roads in the John Day Basin RMP plan area are native surfaced local roads. Map 25 displays those roads with a high probability of being subject to an excess rate of erosion.

Table 4-2 summarizes the direct, indirect, and cumulative effects of the transportation alternatives on soils. Erosion rates are indicated by average annual sediment yield, and alternatives were modeled by Water Erosion Prediction Project (WEPP). Erosion from the BLM transportation network would be 70% lower under Alternatives 2, 4 and 5 than Alternative 3. This difference is due to hydrologic road closures, year-round road closures in the North Fork John Day River area, and planned road rehabilitation. The roads identified for closure and rehabilitation for any alternative are for BLM-managed roads only. Routes designated as open in Alternative 1 are changed to interim designations in Alternatives 2-5.

Cumulatively, erosion from roads in the plan area would be highest under Alternative 3. Alternative 3 would result in 1% less plan area erosion than Alternative 1. Alternatives 2, 4 and 5 would result in 3% less than

**Table 4-2. WEPP Sediment Yield by Alternative.**

Annual Tons of Sediment Produced from the Transportation Network by Alternative  
(Negative numbers indicate erosion eliminated, not totaled)

Road Designation	Alt 1 Sediment (tons/year)	Alt 2 Sediment (tons/year)	Alt 3 Sediment (tons/year)	Alt 4 Sediment (tons/year)	Alt 5 Sediment (tons/year)
Closed Seasonally Other	1.47	1.47	1.47	1.47	1.47
County Road	1,112.23	1,112.23	1,112.23	1,112.23	1,112.23
County seasonally closed for wildlife	6.85	6.85	6.85	6.85	6.85
Forest Service Primary	1,078.35	1,078.35	1,078.35	1,078.35	1,078.35
Forest Service Secondary	10,863.07	10,863.07	10,863.07	10,863.07	10,863.07
Interstate	26.99	26.99	26.99	26.99	26.99
Private	8,756.53	8,756.53	8,756.53	8,756.53	8,756.53
State Highway	296.55	296.55	296.55	296.55	296.55
U.S. Highway	253.97	253.97	253.97	253.97	253.97
BLM Closed	-1.45	-54.83	-54.83	-54.83	-54.83
BLM Closed Seasonally Rehab	0	6.95	6.95	6.95	6.95
BLM Closed Seasonally Wildlife	52.23	143.2	342.56	143.2	143.2
BLM Closed Wilderness Study Area	-150.12	-150.34	-150.34	-150.34	-150.34
BLM Closed Year-round	-239.59	-742.93	-1.72	-742.93	-742.93
BLM Interim Rehab	0	-2.4	-2.4	-2.4	-2.4
BLM Interim Road	796.76	139.5	681.35	139.5	139.5
BLM Not Designated	4.68	0	0	0	0
BLM Proposed New Road	0	4.68	4.68	4.68	4.68
Subtotal Tons of Sediment (BLM only)	854	294	1,036	294	294
Total Tons of Sediment (Cumulative)	23,250	22,690	23,432	22,690	22,690

Alternative 1 (modeled erosion values are displayed in Table 4-2). New roads constructed under all alternatives are designed to meet BMPs and to prevent unacceptable soil erosion and gullyng.

### Vegetation Management Effects on Soils

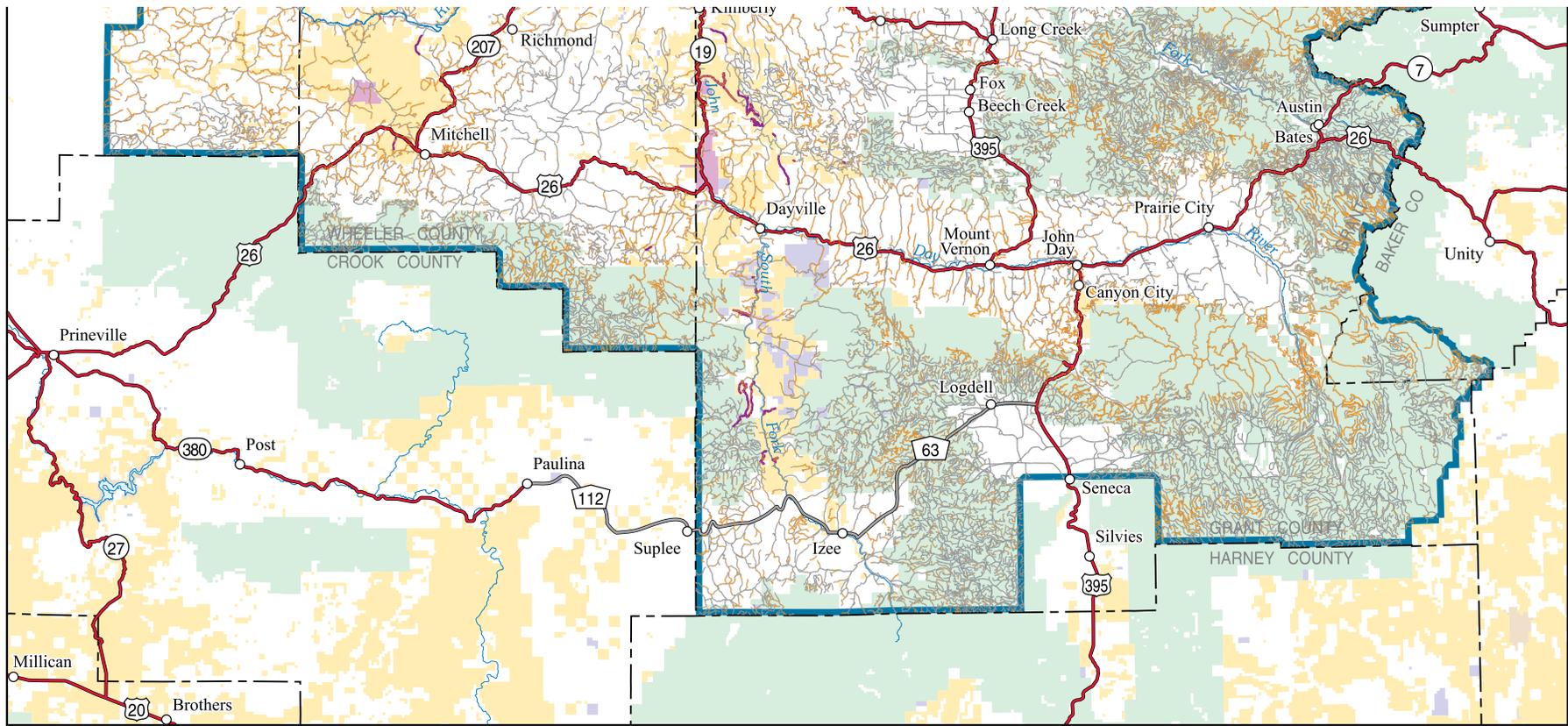
Livestock grazing can cause compaction and soil erosion. Hoof traffic compacts soil, and the removal of ground cover vegetation can leave soil vulnerable to erosion. Concentrated livestock use, such as near salt blocks, shade and watering areas, can both compact soils and eliminate ground cover vegetation. However, erosion and compaction of soils are not absolute to all livestock grazing management. Grazing effects on soils vary according to AUMs (the number of animals grazed), intensity (number of animals per acre), duration (length of grazing period), and season.

With the exception of some proposed allotment closures, these grazing variables would not be specifically modified by any of the alternatives for the plan area. Under all alternatives, grazing would be guided by Standards for Land Health and Guidelines for Livestock Grazing Management in Washington and Oregon (S&Gs). Individual grazing allotments would be evaluated using the five standards for Land Health criteria from this guidance. If current livestock grazing management or numbers are a significant cause for not meeting standards then livestock management, such as animal numbers, season of use, and grazing intensity would be adjusted. Attaining these standards would maintain or improve soil function under all alternatives.

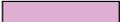
In the plan area, livestock grazing is more frequent and concentrated near water, on flat slopes, and on areas with low amounts of surface rock fragments. Heavy livestock use and hay production considerably reduces the native grass populations along the river corridor and provides opportunity for cheat grass and medusahead to expand their range. These annual grasses provide the fine fuels necessary for increased fire frequency. As an example,



Map 25: Transportation Erosion Estimates



**LEGEND**

-  Road With High Probability of Excess Erosion
-  Road With Hydrologic Repairs Needed
-  Road
-  Planning Area Boundary
- Administered Land**
-  Bureau of Land Management
-  Forest Service
-  John Day Fossil Beds National Monument
-  Other Federal
-  State
-  Private or Other

\*Note: Roads with a high probability of excess erosion have an average erosion rate of greater than 0.75 pounds of sediment eroding per linear foot of road. BLM administered roads may require a change in road maintenance level.

U.S. DEPARTMENT OF THE INTERIOR  
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**PRINEVILLE DISTRICT**  
**John Day Basin**  
**Proposed Resource Management Plan**  
**Final Environmental Impact Statement**

2012

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there were 10 fires from Service Creek to Priest Hole during 2007 (most were lightning caused). Frequent fires maintain these rangelands in a continued early seral state. Over time, this reduces soil function. With the lower root mass of annual grasses contributing less organic matter to the soil, water infiltration, water holding capacity and nutrient cycling are also reduced.

No alternatives propose season-long grazing year after year. Changing climate, forage availability, and other range conditions require frequent grazing management adjustments to ensure compliance with objectives for soils and other resources. Broad seasons of use and AUM levels provide flexibility for annual adjustments in the actual season and amount of grazing authorized. Grazing on the North Fork allotments, like all allotments, would be sustainable, protect soils, and meet Land Health Assessment's Standards and Guides.

As this plan does not propose grazing management changes outside of the North Fork acquired lands, it is anticipated that grazing effects on soils would not differ between alternatives. However, if grazing allotments are relinquished, and ecological conditions are early seral with invasive annual grasses (e.g., cheat grass and medusahead), burn frequencies could increase. This would allow for the possible spread and expansion of these invasive grasses into existing native shrub and grass communities. The low root mass of the annual grasses in a terminal steady state would gradually reduce soil function over the life of the plan. Under this scenario, loss of soil function from least to greatest is: Alternative 1, followed by Alternatives 3, 4 and 5, and finally Alternative 2.

Relinquishing allotments with mid to late seral vegetative communities would have different impacts. The lack of livestock use would allow the native vegetative communities to move toward later seral ecological conditions.

Later seral ecological communities normally have higher native grass to shrub and tree ratios that increase the fine root mass from native grasses, and increase soil function. Also, the lack of livestock use would reduce trampling compaction on soil close to water sources. Under this scenario, loss of soil function from least to greatest is Alternative 2 followed by Alternatives 3, 4, and 5, and finally Alternative 1.

## **Wildlife Effects on Soils**

The effects of antelope, deer, elk and wild horse grazing on the soil resource are similar to the impacts of domestic livestock. Concentrated trampling and intensive use can result in compaction, reduced vegetative cover and ultimately erosion and loss of soil function. Presently, only scattered trampling and erosion problems occur.

There is a risk, however, that anticipated increases in the size of elk herds, regardless of alternative, could result in accelerated erosion on fragile, non-forested portions of the winter ranges managed to provide winter forage. These areas were severely eroded during the early years of sheep and cattle grazing. Since wildlife populations are influenced by habitat conditions both on and off BLM lands and the plan area, differences in soil impacts as a result of the alternatives are likely to be negligible.

Seasonal road closures to improve wildlife winter habitat conditions and to reduce the animal stress from people would reduce rutting from vehicle use of the transportation system. Closing roads in early spring when conditions are too wet for driving would reduce rutting and erosion of these roads. Higher road densities result in increased soil compaction and greater loss of soil productivity than lower road densities. The resulting soil compaction and loss of soil productivity are least in Alternative 1; intermediate in Alternatives 2, 4, and 5; and greatest in Alternative 3.

## **Wild Horse Management Effects on Soils**

Under Alternatives 2-5, wild horse management is specifically tied to meeting soil detrimental impact objectives.

The detrimental soil impact objectives are not included in Alternative 1. Therefore, detrimental soil impacts from wild horse management would be less in Alternatives 2-5 than Alternative 1.

## **Fire Management Effects on Soils**

Fire management activities affect the soil resource in three ways. The first, machines used for piling slash compact and displace soil; second removing woody debris reduces long-term productivity of the site; and third fire can

directly alter the chemical and physical soil properties. Machine piling is the leading cause of soil compaction in forested areas, based on Malheur National Forest monitoring results.

Prescribed fire has short- and long-term effects on soils. Immediate effects result from the loss of protective organic matter (i.e., live and dead vegetation), disturbance of biological crusts, and changes in the physical and chemical characteristics of the soil surface. These effects vary according to the fire intensity and duration. High fire intensity or duration may cause some soils to become hydrophobic (water repellent), which impedes infiltration and increases surface runoff. However, some coarse textured sandy and pumice soils are naturally hydrophobic. Volatilization of nutrients may cause additional long-term loss of site productivity. Germination, vigor, and spread of some noxious weed species and introduced annuals are more pronounced following fire. Fire applied in inappropriate locations, such as warm and dry sites or sites with south aspects and high annual to perennial grass ratios, can allow undesirable plant species to increase and spread. Fire's effects on soils may be greater on sites with undesirable plant species (annual grasses) than on sites where healthy native vegetation is present.

One consequence of not applying mechanical or prescribed fire fuels treatments could be an increase in large, high-intensity wildfires. These hot burning fires (>300 °C) can dramatically reduce soil productivity through volatilization of nutrients and surface organic matter. The short- and long-term loss of watershed cover can also increase erosion rates (see Fire Management effects).

Juniper invasion is increasing throughout the plan area (see Appendix F). With this increase in juniper density, it is expected that Alternative 1 would have the greatest potential for stand replacement wildfires. The increased mechanical treatments proposed in Alternatives 2 through 5 would reduce the wildfire potential, but would have effects similar to those described in the vegetation management section on detrimental impacts to soils. The effects of these vegetation treatments would be most intense around communities within the first band of the wildland urban interface (see Fire and Fuels section, Chapter 2). Best management practices, adaptive management, and monitoring are expected to reduce or minimize the detrimental effects on soil productivity from these actions.

## **Mining and Energy Development Effects on Soils**

Mining exploration and development can dramatically reduce soil productivity and soil function, with the extent of effect depending on the intensity and amount of activity. Of all the types of mineral extraction, surface mining causes the greatest loss of soil function and productivity. This type of mining generally involves removing the productive surface soil to access the ore-bearing substrata below. Underground mining impacts less surface area.

Resource and resource use protections applied to mineral use include mineral withdrawals, requirements for no surface occupancy, avoidance areas, stipulations and BMPs. Following the BMPs (such as requirements for surface rehabilitation of a comparable area of disturbance) would keep the disturbance area small, which improves long-term soil function. Stipulations requiring two years of follow-up monitoring of erosion control measures and revegetation success increase soil productivity. These increased protections from surface mining activities result in greater soil productivity and soil function under Alternatives 2-5 than in Alternative 1.

With increased interest in wind power generation, the road and power line infrastructure needed to develop this technology would be expected to increase. Disturbed soil areas around wind towers and along power line roads would further reduce perennial native vegetative cover increasing the amount of soil area exposed to wind and water erosion. Also, the new corridors opened up to wind power would provide more opportunities for off-road OHV use that could further destabilize soil areas prone to erosion.

## **Effects of All Alternatives on Soils**

Using adaptive management with a concerted effort for finding the most effective best management practices for minimizing detrimental soil impacts is essential to implementing a successful plan. Of the proposed alternatives, Alternatives 4 and 5 are the most favorable to soil function followed by Alternative 2. Alternative 1, the No Action Alternative, is most impacting of all alternatives, followed by Alternative 3. Table 4-3 summarizes the cumulative effects of the alternatives on soil function for this plan.

**Table 4-3. Comparison of Alternatives Effects on Soils.**

Resource Use	Alternative				
	1	2	3	4	5
Recreation Non-motorized		●	●	●	●
Recreation Motorized		○	○	●	●
Transportation		●		●	●
Timber/Compaction		●	●	●	●
Grazing (areas in good range condition)		●	○	○	○
Grazing (areas with invasive plants)	●				
Road Density Standards		○	○	●	○
No Road Density Limit		○	○	●	●
Wild Horse Management		●	●	●	●
Wildfire Risk		●	●	○	●
Mining		●	●	●	●

● represent the alternatives that best address soil productivity and function for a specific resource use.  
 ○ represent the alternatives determined to have relatively the same effects as those rated best.

**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. 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.

**Carbon Storage and Greenhouse Gas (GHG) Emission**

The analysis below focuses on carbon storage and greenhouse gas emissions (GHG), such as carbon dioxide and methane that may occur as the result of planning decisions set forth in this RMP. Analysis of dust and smoke effects associated with vegetative treatments, travel, and recreation activities are included the Air Quality section.

**Carbon Storage and GHG Emission Indicators**

- **Acres of each vegetative type.** The number of acres is an indicator of the amount of carbon stored in live and dead vegetation, litter or duff, and soil.
- **Acres burned by prescribed fire.** The number of acres proposed to be burned is an indicator of the amount of carbon dioxide that would be released.
- **Acres cut or mowed for fuels treatment, wildlife habitat improvement, timber production, and other reasons.** The number of acres proposed for cutting is an indicator of the amount of carbon stored in wood products, and of the GHG emissions from timber equipment operation and hauling.
- **Miles of interim routes.** The amount of carbon emissions from motorized travel is assumed to be proportional to the miles of routes available.
- **Area Open for motorized use off road.** The amount of carbon emissions from off road motorized use is assumed to be proportional to the acreage of land allocated for “Open” use.
- **Number of AUMs.** The release of methane from livestock grazing is indicated by the AUMs available.

## Carbon Storage and GHG Emission Assumptions

This analysis focuses on the alternative components where the amount of carbon stored or released can be estimated, including:

- prescribed burning
- mechanical vegetative treatments (including timber harvest)
- motorized recreation
- livestock grazing

Analysis based on assumptions does not provide exact figures, but it does allow a comparative examination of the effects of the alternatives.

This analysis considers the role of natural processes and human actions in the carbon cycle. The carbon produced each year as vegetation biomass in the planning area is assumed to have one of the following fates:

- Storage in the ecosystem in the form of perennial plant biomass (e.g., roots, woody material) or soil organic carbon;
- Storage in products (e.g., house framing, furniture);
- Return to the atmosphere as carbon dioxide, either through plant and animal respiration, decomposition of plant biomass, and especially through consumption of plant material in wildland fire; or
- Return to the atmosphere as methane gas, through fermentation as rotting biomass or from the digestive system of ruminant animals (e.g., cattle).

This analysis assumes prescribed fires consume 40 percent of the acres in each burn unit. Within that burned area, 100 percent of the shrubs, grass, litter, needles and bark are consumed. The trees themselves rarely burn, but they often die from the heat, loss of needles and bark, or both. If the trees are on the ground and dead, 50 percent of them will be consumed in the fire. About 75 percent of prescribed burns on the BLM lands are on juniper sites with live trees, and the remaining 25 percent are on juniper sites with dead and down trees. Forestland burns generally involve live trees or no trees (trees removed from the site during harvest). Burning creates carbon dioxide emissions at a rate of 3.7 tons of carbon dioxide per ton of carbon.

The primary source of carbon dioxide emissions from cutting and mowing vegetation is from the fuel use associated with treatment. Most of the carbon “treated” is left on site where it will decay slowly over time. A portion of the carbon in forest acres is converted to lumber (2,540 board feet per acre harvested) and stored off site. Lumber “decays” through burning (sawdust or waste) or decay at an average 0.6 percent per year. Some juniper cut on rangelands will be used for fuel or furniture, but the amount is low and difficult to estimate. Most of the vegetation on treated acres will remain on site and decay over time; some will be consumed by wildfire or prescribed burns at a later date. The average annual accumulation and emission of carbon by vegetation is presented in Chapter 3, Carbon Storage. There is considerable variation in and scientific controversy about the rate of accumulation in recently cut or burned areas. The difference in carbon decay rates on site and off site (in lumber) result in very small differences in carbon emissions, masked by carbon accumulations in the remaining vegetation. The analysis in Chapter 4 does not attempt to measure these variations; instead it assumes a static rate of accumulation/emission across the planning area.

Annual fuel consumption associated with each 100 acres of timber harvest is assumed to be about 150 gallons of diesel fuel on site (50 gallons a day for 30 days), and an additional 100 gallons diesel fuel for hauling lumber to the mill (estimate 5 trips of 100 miles each at 5 miles per gallon). Annual fuel consumption associated with each 100 acres of rangeland cutting, moving or burning is assumed to be about 25 gallons per day for 10 days. Fuel use for burning forestland is assumed to be similar as for burning rangeland. Vehicles convert gasoline to greenhouse gasses, primarily carbon dioxide, but also methane and nitrous oxide, at a rate of 0.0092631 metric tons carbon dioxide equivalent<sup>1</sup> per gallon.

<sup>1</sup>The term “carbon dioxide equivalent” is used to allow comparison of other greenhouse gases to an equivalent amount of carbon dioxide. For example, methane has a global warming potential 21 times that of carbon dioxide.

While prescribed burns, cutting and mowing produce carbon dioxide, so too would the wildfires (and wildfire suppression activities) these vegetative treatments can help prevent. However, wildfires are variable and it is impossible to predict when or where they will burn, so this analysis does not measure the effects of wildfire.

Motorized travel by recreationists on BLM dirt- and gravel-surfaced roads, trails, and open areas results in gaseous emissions from fuel combustion. As more roads or areas are available, one could assume that more use occurs in the planning area. The analysis below assumes that each route in the interim transportation plan is driven once each day on average; each 1,000 acres “open” to off road use receives one mile of use per day; and vehicles get 20 miles per gallon on average to allow a relative comparison between alternatives.

Ruminant animals, including domestic cattle and sheep, produce methane as a byproduct of their normal digestive process. Methane emission rates from cattle vary widely and depend on many variables. Estimates for grazing cattle typically range from 6.7 to 9.2 kilograms of methane per month per animal (EPA 2009). Since the BLM does not have data on the actual emissions for this area, this analysis assumes a methane emission rate of 8 kilograms of methane per animal unit month (AUM), which is an average of the estimates cited from EPA, above. Since methane has a global warming potential 21 times carbon dioxide (EPA 2009, p. ES-3), each AUM results in 0.168 metric tons of carbon dioxide equivalent.

Most lessees’ base property is adjacent to the allotment they graze, requiring no hauling; therefore hauling costs are not included in the analysis. The amount of methane, or carbon dioxide equivalent, is estimated based on available AUMs. As with prescribed burning, the net contribution to carbon storage versus carbon emission from livestock grazing is complicated because as the grass regrows after grazing, carbon accumulates faster in the new growth and in the soil. This contribution to carbon storage is not accounted for in this analysis. While wild ruminants such as deer, pronghorn and elk also produce methane emissions, these were not included in this analysis because the number of wild animals in the planning area has not been quantified, and the effect would not vary by alternative.

The effects of other actions proposed in the alternatives are not analyzed in detail here because there would be no emissions, the expected emissions are so small as to be negligible, or the potential for the action is low. No carbon dioxide emissions would result from non-motorized recreation uses, changes in land tenure, management to protect wilderness characteristics, or closures to firearm discharge. The potential for energy and mineral development in the planning area is low, and the area available for these uses varies little between alternatives. Therefore, there is little basis for comparison between alternatives, and that analysis is not attempted here.

## Analysis of the Effects of the Alternatives on Carbon Storage and GHG Emission

Table 4-4 summarizes the effects each alternative would have on carbon emissions, as described in further detail in the rest of this section. The amounts are expressed in tons of carbon dioxide or equivalent stored or released each year. The total contribution of planned activities to GHG emissions would be greatest in Alternative 1, with the annual emission of 25,715 tons of carbon dioxide equivalent. Emissions from actions in the Preferred Alternative (2) would be 22,093, which is under the 25,000 ton limit set by the EPA for reporting under the Clean Air Act. Alternative 2 emissions would be about 0.04 percent of the total emissions statewide. Emissions for the entire state are 70 million tons of carbon dioxide equivalent each year (Oregon Global Warming Commission,

**Table 4-4. Annual Contribution to Greenhouse Gas Emissions (in tons of CO<sub>2</sub> or equivalent) of Planned Actions on BLM-managed Public Lands.**

Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Prescribed burning	20,934	20,934	20,934	20,934	20,934
Mechanical treatments	42	160	160	160	160
Recreation and travel	178	62	161	61	61
Livestock grazing	4,561	937	1,924	1,828	1,900
Total	25,715	22,093	23,179	22,983	23,055

2009), and nationwide emissions are 7 billion tons (EPA 2009). For perspective, the average U.S. household produces 38.3 tons of carbon dioxide from home energy use, driving, flying, and food.

### **Prescribed Burning Effects on Carbon Storage and GHG Emission**

All alternatives propose the same amount of prescribed burning: 400 acres of forestland and 2,500 acres of rangeland each year.

There are 55.6 tons of carbon per acre in forests and 9.5 tons per acre on rangelands, as stated in the Chapter 3 carbon storage section. This includes live and dead trees and other vegetation, including litter and duff.

The biomass consumed by the proposed burns would result in the direct emission of 17,575 tons of carbon dioxide on rangelands, and 3,292 tons of carbon dioxide on forests per year. Fuel use for these 2,900 acres of prescribed burns would be 7,250 gallons, producing 67 tons of carbon dioxide. Total emissions for these treatments would be 20,934 tons of carbon dioxide per year.

### **Mechanical Treatment Effects on Carbon Storage and GHG Emission**

Alternative 1 would cut/mow 500 acres of rangeland and cut 200 acres of forest land, annually. Trees cut from forest land would continue to store carbon, but now off site in lumber rather than on site in live and dead trees. Fuel consumed annually during harvest of forest land and hauling of timber products would produce 30 tons of carbon dioxide. Cutting/mowing 500 acres of rangeland would leave the carbon on site but would emit 12 tons of carbon dioxide annually as a result of fuel use during treatments. Total emissions for the forest and range treatments in Alternative 1 would be 42 tons of carbon dioxide per year.

Alternatives 2-5 would treat the same amount of rangeland acres, resulting in the same amount of carbon dioxide release. These alternatives would treat 1,000 acres of forest land, as opposed to only 200 acres in Alternative 1. Total emissions for the forest and range treatments in Alternatives 2-5 would be 160 tons of carbon dioxide per year.

### **Recreation and Travel Management Effects on Carbon Storage and GHG Emission**

For Alternative 1, an estimated 13,542 gallons of fuel are used annually on the 742 miles of routes, and 4,271 gallons of fuel are used annually on the 234,272 acres "open" to motorized use, for a total of 17,813 gallons of fuel per year. Therefore, the tons of carbon dioxide emitted annually under Alternative 1 would be 178. Motorized use would release more carbon dioxide to the atmosphere in Alternative 1 than in the other alternatives. The tons of carbon dioxide produced annually by motorized use in Alternatives 2, 3, 4, and 5 would be 62, 161, 61, and 61, respectively.

### **Livestock Grazing Management Effects on Carbon Storage and GHG Emission**

The AUMs available in Alternatives 1-5 are 27,148; 5,578; 11,454; 10,883; and 11,308, respectively. Assuming the AUMs available are an indicator of methane emissions, and one ton of methane is the equivalent of 21 tons of carbon dioxide, emissions would be greatest in Alternative 1 (the equivalent of 4,561 tons of CO<sub>2</sub>) and least in Alternative 2 (937 tons of CO<sub>2</sub>).

### **Cumulative Effects on Carbon Storage and GHG Emission**

The types of actions generally attributed to increased atmospheric GHG emissions are discussed in Chapter 3. Current scientific research has not confirmed a direct link between any particular emission of GHG and global climate change. As noted in the Incomplete or Unavailable Information listed above further research is necessary to make direct, indirect, or cumulative effects determinations.

Actions on BLM-managed public land within the planning area produce between 22,093 (in Alternative 2) and 25,715 (in Alternative 1) tons of carbon dioxide (or equivalent) each year, primarily as a result of prescribed burns, vegetative treatments, recreation and travel, and livestock grazing (summarized in Table 4-4). Assuming a similar rate of emissions on the nearly 5 million acres of non-BLM lands in the planning area, actions on these lands would produce 248,183 tons of carbon dioxide equivalent. The combined emissions from all lands within the planning area would be 270,276 tons of carbon dioxide equivalent in Alternative 2. This is 0.4 percent of Oregon's total emissions.

# Air Quality

## Introduction

Analysis of the environmental consequences of the alternatives on air quality considered the following key resources or resource uses: Vegetation (noxious weed control, vegetation treatments), Fire and Fuels (wildland fire), Energy and Mineral Resources, Recreation Opportunities (motorized uses), and Travel Management. The analysis below focuses on dust and smoke, which are the primary influences on air quality. For analyses about gaseous emissions (e.g., carbon dioxide and methane), see the Carbon Storage and Greenhouse Gas Emissions section. Indicators used to compare environmental consequences between alternatives include: acres burned, miles of road, and acres of land available for mineral development.

## Air Quality Indicators

- **Acres burned.** The number of acres burned is an indicator of the amount of smoke particulate matter released. Forested ecosystems that contain more overall biomass are assumed to yield more smoke than the more lightly vegetated rangelands and shrub-steppe ecosystems (Anderson *et al.* undated). The plan is strategic rather than specific and, therefore, the total annual emissions from burning of piles, underburning, and broadcast application of fire is not directly measurable, but is indicated by acres of treatment proposed.
- **Miles of road and motorized trails.** The amount of fugitive dust from roads would be proportional to the miles of the roads. Most BLM roads are native or gravel surface, which can produce dust.
- **Area Open or Limited for OHV use.** The amount of dust from OHV use is assumed to be proportional to the acreage of land allocated for OHV use.
- **Acres of land available for mineral development.** The amount of fugitive dust for mining operations would be proportional to the availability of land for mineral development.

## Air Quality Assumptions

- Sources of air pollutants for all alternatives in this plan are limited to smoke from wildland fire and prescribed burning, herbicide applications, and dust from use of unsurfaced roads as well as road construction activities.
- Wildfires in rangeland are assumed to continue at their current frequency, intensity and duration on average. Wildfires in forestlands are predicted to increase in frequency, intensity, and duration as the climate continues to change. However, it is not known when these changes will occur or how they will play out over the plan area.
- While other sources of emissions (i.e., from road construction, maintenance and use, mining, travel, and farming) are locally important, fire use could degrade regional or airshed air quality.
- Smoke emissions from large late-summer prescribed burning will generally dissipate to the south of the plan area, in the direction of the most common winds. Prevailing winds are north-northwest in the summer and early fall months and are southerly for the rest of the year.
- Smoke management strategies will be coordinated with state and local authorities as fire is used more frequently to preserve, restore, or maintain forest and rangeland health and reduce hazardous fuels, primarily in the urban interface. All smoke emissions are coordinated through the Oregon Department of Forestry under the Oregon Smoke Management Plan (SMP). The SMP now covers the entire state for forested lands. Prescribed fire on forested BLM lands in the plan area will follow the SMP. Rangeland burning is not covered by the SMP.
- Smoke from prescribed burning competes with smoke from agricultural burning, residential wood consumption, and smoke from neighboring agencies relative to smoke limits. Wildfires from within the plan area and also upwind sources on other ownerships will continue to contribute sporadic smoke impacts in the summer months. Many of the smoke impacts to the area come from field burning to the north and west and from wildland fires on the Malheur, Ochoco, and Umatilla National Forests.
- None of the alternatives propose changes of a magnitude that would violate the Clean Air Act.

## Analysis of the Effects of the Alternatives on Air Quality

### Effects Common to All Alternatives

Proposed management of the following resources or resource uses would not have impacts to air quality: Aquatic Resources, Wild Horses, Lands with Wilderness Characteristics, Cave Resources, Visual Resources, Special Designations, Native American Uses, Paleontological Resources, Cultural Resources, Livestock Grazing, and Lands and Realty.

All of the alternatives would treat the hazardous fuels in the Wildland Urban Interface (WUI) as identified in Community Wildfire Protection Plans (CWPPs). This would have the effect of producing particulate matter, but since all burning activities would comply with the Oregon State Smoke Management Plan and the Clean Air Act, no air quality effects would be expected to exceed the National Ambient Air Quality Standards (NAAQS).

Burning would occur in the uplands away from the populated areas for vegetation management objectives (see Vegetation section, Chapter 2). While the preferred disposal of hazardous fuels is use as commercial product or biomass energy sources, burning would be done where those options are not feasible due to access or economic factors. Areas in conifer forest environments are more likely to contain piles for burning than rangeland ecosystems. Piles would be burned in the spring or fall after some precipitation has been received to limit the potential for fire spread, but while the larger material in the piles is still dry enough to burn. Dry fuels burn cleaner and hotter than wet fuels; therefore, less smoke is produced. All burning would 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. (The Strawberry Wilderness is the nearest Class 1 airshed.) Despite mitigation measures to reduce impacts, smoke would still be visible and could cause a temporary localized exceedence of particulate matter standards or result in impaired visibility.

### Vegetation Management Effects on Air Quality

Mechanized activities associated with vegetation treatments would create dust and gaseous emissions from road construction, use of heavy equipment, and timber hauling. Dust would settle within a short time period and stay close to the point of origin. Since the average annual amount of mechanical vegetation treatments increases from 700 acres under Alternative 1 to 1,500 acres under Alternatives 2-5, Alternative 1 would have less gas and dust emissions than Alternatives 2-5.

Herbicide use for noxious weed control would be similar between alternatives. Herbicide use is highly localized and constrained by BMPs to control drift, so there would be no substantial difference in herbicide drift between alternatives.

### Fire and Fuels Management Effects on Air Quality

Smoke emissions (including greenhouse gases, see Chapter 3) from wildland fires are a short-term event, mainly restricted to the active burning phase of the event. Rangeland fires are typically hot, rapid events in which most of the fuel 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. Woodland, shrubland, and grassland fuels have a relatively short residual burning period. The length of time that smoldering combustion continues is measured in hours, rather than days or weeks as in forested vegetation types (Anderson *et al.* undated, Keane *et al.* undated).

Under Alternative 1, there are 2,900 acres per year proposed for prescribed burning (Table 4-5). Alternatives 2-5 also propose to burn approximately 2,900 acres a year with an additional 1,500 acres of unplanned ignitions managed to achieve resource and protection objectives. The number of acres burned per year (Alternatives 2-5) could be larger or smaller than suppression (Alternative 1). The actual magnitude of change would not be known until the direction is implemented and has time to “mature.”

Managing unplanned ignitions to achieve resource and protection objectives could increase smoke emissions above those generated by response efforts. In the long term, however, additional acres burned through this strategy could also result in less stand-replacement wildfire. Reductions in stand-replacement wildfire would result in a net decrease in emissions under Alternatives 2-5, compared to Alternative 1.

Under Alternatives 2–5, managing unplanned ignitions to achieve resource and protection objectives could emit smoke longer than planned ignitions, depending on the vegetation types involved. Alternatives 2–5 have the potential to violate NAAQS. These violations are more likely to occur in severe burning conditions with multiple large fires burning across multiple jurisdictions. Longer duration fires would result in longer periods of time when smoke may limit visibility and elevate levels of particulate matter. Severe wildland fires would result in greater direct, short-term emissions due to large volumes of smoke. Indirect impacts from severe fires could stem from reduced or eliminated vegetation cover, exposing the underlying soil to wind and water erosion, which would in turn increase levels of dust during wind events. Although treatment efforts to reduce fuel loads would result in some direct but minor impacts to air quality, decreasing the potential of catastrophic wildfire would reduce particulate matter emissions over the long term. If the use of appropriate response on approximately 1,500 acres per year under the action alternatives results in fewer large fires, in the long term it would likely result in greater air quality than Alternative 1.

Smoke emissions from specific unplanned ignition and prescribed burn projects are managed under project-specific smoke management plans. Moderate amounts of smoke could be experienced in the immediate vicinity of treatment areas. However, the smoke would be a short-term emission, as most of these activities would take place to the east of populated areas and would be executed under conditions that would carry smoke eastward. Smoke mitigations from smoke management plans are similar across all alternatives.

The geographic area of analysis for cumulative impacts to wildland fire is the plan area and adjacent lands. Wildland fires in the region would continue to periodically contribute particulate matter to the airshed. Drought can increase the available fuel loadings in forests and some woodlands, thereby increasing potential fire intensity and fire size, the amount of biomass consumed, and therefore the particulate emissions. The Ochoco, Malheur, and Umatilla National Forests are increasing the annual acres burned in response to the National Fire Plan. Fuel treatments and unplanned ignitions managed to achieve resource and protection objectives and to move the landscape toward desired condition anticipated over the life of the plan, in conjunction with concurrent anticipated community hazardous fuels reduction projects and BLM actions are expected to increase total emissions in the short term with an expected long-term reduction in the total volume of wildland fire emissions as fuel breaks become more common and the probability of smaller fires increases. BLM action, in combination with other regional actions, would not cumulatively exceed the thresholds of the Clean Air Act standards because actions would be carried out in compliance with the State Smoke Management Plan.

### **Minerals Management Effects on Air Quality**

Areas available for mineral leasing, sale or location would have effects on air quality. Sources such as construction, mining, and processing operations emit dust. Fuel consumption contributes gaseous emissions. Emissions of dust and gases would be greater under Alternative 1, where 74% of BLM lands are available for minerals, than under Alternatives 2–5, where 67% is available.

### **Recreation Management Effects on Air Quality**

The OHV travel by residents and recreationists on BLM dirt and gravel-surfaced roads, trails and open areas causes dust emissions. Within areas with a Limited designation, OHV use occurs on designated trails. In Open OHV designation areas, repeated use or use on sparsely vegetated rangelands may also produce dust, such as in the Little Canyon Mountain area. Alternative 1 has 98% more area of Open OHV designation than Alternatives 2–5. Therefore, Alternatives 2–5 would have fewer emissions of dust and gas from OHV use than Alternative 1.

### **Travel Management Effects on Air Quality**

Use of the interim and final transportation network by motorized vehicles would result in dust emissions. During the summer months, dust is produced from both public and administrative use of unpaved roads. Alternative 1 has 742 miles of interim routes; Alternatives 2, 4, and 5 have about 333 miles of interim routes; and Alternative 3 has 879 miles of interim routes, including 137 miles previously closed routes in the North Fork. Therefore, emissions of dust from the transportation network are assumed to be greatest under Alternative 3, less under Alternative 1, and least under Alternatives 2, 4, and 5.

## Cumulative Effects to Air Quality

Wildland fires in the region would continue to contribute particulate matter to the airshed periodically. Increasing recreational use would increase the probability for airborne dust related to travel on dirt and gravel-surfaced roads. The National Forests to the south and east and northeast of the planning area are increasing the annual acres burned in response to the National Fire Plan. Wildland fire, vehicle emissions, wood heat smoke in rural communities, and fugitive dust all contribute to the degradation of air quality. However most of the emissions would be spread out over time and distance. Prescribed fire emissions are regulated by Oregon State Smoke Management Plan to minimize air quality effects on communities. There is potential for multiple wildfires in the planning areas and lands adjacent to the planning area to cause short term degradation to air quality in the planning area. The fuel treatments anticipated over the life of the plan, in conjunction with concurrent anticipated community hazardous fuels reduction projects, would be expected to eventually reduce the total volume of summer wildfire emissions as fuel breaks become more common and the probability of stopping fires increases. There is a potential for increased fire emissions in the future if temperatures go up and wildfire season is lengthened due to climate change.

## Vegetation

### Introduction

Analysis of the environmental consequences of the alternatives on terrestrial and riparian vegetation considered the following key resources or resource uses: Vegetation, Fire and Fuels, Aquatic Resources, Lands with Wilderness Characteristics, Visual Resources, Special Designations, Livestock Grazing, Recreation Opportunities (OHV use), Energy and Minerals, and Lands and Realty.

Effects to vegetation depend on the amount, type, location, and method of treatments allowed and the resultant vegetation community characteristics. When effects analysis requires more than a general discussion of vegetation management, Biophysical Settings (BpSs) were lumped into the following similar functioning groups: Grassland, Shrubland, Forestland, Juniper Woodland, Riparian, and Potential Restoration Needs. Individual BpS analysis and a key to their general functional groups are contained in Appendix F.

### Vegetation Indicators

Indicators used to compare environmental consequences on vegetation conditions between alternatives include:

- **Percent of treatment need met based on ARV.** Treatment need met is used as an indicator of the level of attainment of ARV objectives. Managing vegetation within site capability reduces the amount of uncharacteristic disturbance, provides spatial distribution to allow genetic exchange, and ensures that vegetative species compositions and structures exist in sufficient quantities to provide resiliency when disturbance does occur.

For analysis purposes, the current treatment need identified to reach ARV is assumed to provide a relative amount and type of treatment needed over the longer term. These are not prescribed treatment numbers, but are being used to display likely treatment types and amounts for the purpose of effects analysis. Yearly budgets and personnel availability, weather, and refinements in site-specific data may result in a variation in acres implemented yearly or in total, but the types and relative amount of treatment should be consistent. Due to this variability, the following analyses represent outcomes of treatment averages by alternative (Table 4-5).

- **Location and type of treatment – prioritization criteria.** Targeted vegetation treatments across the landscape are more likely to alter seral structural conditions in areas and methods necessary to better achieve ARV objectives across the landscape. Targeting treatments will also increase the likelihood that vegetative conditions will respond to natural disturbances in sizes and intensities that will retain or enhance seral structural compositions and facilitate moving those conditions furthest out of balance into ARV.
- **Fire Regime Condition Class (FRCC).** FRCC is a measure of vegetation condition as it relates to natural disturbance or fire regime. FRCC provides a sense across the landscape of how departed vegetation

**Table 4-5. Annual and 30-year vegetation treatment assumptions by alternative.**

Treatment Type	Alternative 1		Alternatives 2-5	
	Rangeland* Annual Acres Treated (30-year total **)	Forest Annual Acres Treated (30-year total)	Rangeland Annual Acres Treated (30-year total)	Forest Annual Acres Treated (30-year total)
Prescribed fire	2,000 (60,000)	300 (9,000)	2,000 (60,000)	300 (9,000)
Mechanical	500 (15,000)	200 (6,000)	500 (15,000)	1,000 (30,000)
Maintenance***	500 (15,000)	100 (3,000)	500 (15,000)	100 (3,000)
Appropriate Response****			1,500 (45,000)	
Yearly Totals	3,000	600	4,500	1,400
30-Year Totals	90,000	18,000	135,000	42,000
Current Need	146,746	50,977	146,746	50,977
% of Current Need Met in 30 Years	61%	35%	92%	82%

\*Rangeland = grass, shrub, and juniper woodlands (See Appendix E – BpS summary and Appendix F – BLM BpS analysis and grouping).

\*\*Numbers in parenthesis are yearly averages projected for 30 years.

\*\*\*Maintenance will be prescribed fire entries following the first prescribed fire entry.

\*\*\*\* This is an estimate that may vary considerably from year to year. The frequency and occurrence of lightning in a given year cannot be predicted.

conditions are from historic conditions relative to the expected type, intensity, and spatial distribution of fire and other disturbances.

- **Old growth.** Future treatments are more likely to retain old growth trees when clear definitions and management direction are provided. Identification of appropriate locations (Biophysical Settings) where old growth juniper would naturally occur increases the potential for long term sustainability of these conditions. Due to the time necessary to generate old growth characteristics and stands, the protection and management emphasis on these characteristics is necessary to ensure that ARV objectives for large structure and late seral conditions are attained.
- **Acres available for forest product production.** The potential to utilize forest material as a source of funding to offset treatment costs will allow greater amounts of treatment to be completed. Utilizing forest material will also reduce fuel loadings and increase the potential that wildland fire to achieve resource objectives could be implemented and meet vegetative objectives.
- **Area and type of riparian management objectives.** Restrictions applied within riparian areas influence the ability to treat vegetation. Without treatment, overstocking and shade-tolerant species can dominate sites and reduce the amount of early to mid-seral conditions that occurred under Pre-European disturbance levels.
- **Area available for Appropriate Response or full suppression.** Suppression of fires over the last 100+ years has resulted in species composition and fuel load changes. The ability to manage wildfires under specific conditions allows for greater amounts of area where adjustments to species composition and fuel loadings can be treated.
- **Acres of VRM Class I or II and Area of Critical Environmental Concern/Research Natural Area (ACEC/ RNA).** Lands with these designations reduce the amount or tools available to treat vegetation compared to VRM Classes III and IV. Limiting the tools or amount of area that can be treated will result in greater amounts of early or late seral conditions. There is also a greater risk of overstocked stands and stand-replacing disturbances.

## Vegetation Assumptions

- For the purposes of commercial activities, administrative access would be allowed on closed roads to meet vegetation objects; however, fewer open roads available to the public would limit the ability to access forest products.

- Grazing adjustments to season and stocking will continue to be analyzed through the permit process and monitored through processes such as Standards & Guidelines, to ensure that grazing management is consistent with site capabilities.
- Grazing reduces fine fuels and thus, under certain grazing seasons, reduces fire risk.
- Grazing use will meet Land Health Standards and Guidelines and thus not increase the amount of invasive grass substantially enough to affect fire regimes.
- All alternatives would follow state and federal guidelines for WUI designation; however, existing WUI mapping areas would be updated with new designations, as appropriate.
- The primary emphasis of vegetative treatments within Suppression Areas (Alternatives 2-5) and WUI Areas (Alternative 1) would be for fuels objectives associated with protection of resources and fire fighter safety, and thus more intensive than treatments outside of these areas.
- The ability to use the full range of Appropriate Response would move more vegetation stands towards FRCC1.
- Past management has contributed to current vegetation treatment needs.
- For the purposes of this analysis, it is being assumed that mechanical or prescribed fire treatments would not be done in seral conditions that are deficit across the plan area, except possibly in the case of “maintenance” treatments (i.e., the area has about 6,300 acres less of open, mature mesic ponderosa pine forest than is representative of ARV). Existing stands of open, mature mesic ponderosa pine would only be treated if “maintenance” (underburn) were needed. Also, no treatment was assumed necessary where early seral conditions (seral class A) are currently in surplus, except possibly in the case of seeding.

## Analysis of the Effects of the Alternatives on Vegetation

Vegetation was analyzed to assess the effects of attaining alternative objectives.

### Effects on Vegetation Common to All Alternatives

For the following resources/programs, there are no new actions proposed or no anticipated impacts at this scale on vegetation communities, their management, or commodity production: Soils, Air Quality, Vegetation—Special Status Plants, Paleontological Resources, Cultural Resources, Recreation Opportunities, and Lands and Realty.

Within grasslands, the plan area currently has high amounts of uncharacteristic vegetation conditions due to the abundance of annual grass, noxious weeds, and farmlands. Under all alternatives, treatments in grasslands would continue to include spraying herbicides to control weeds, burning, and seeding.

Currently Aldrich Mountain and Strawberry Mountain WSAs contain forest vegetation with tree densities and/or slash loads above preferred levels. Under Alternative 1, portions or most of these stands would be lost to insects, diseases or wildfires unless prescribed burning is used to control densities and slash loads.

### Vegetation Management Effect on Vegetation

#### Indicator: Treatment Need Met (current) and Location and Types of Treatments

Vegetation treatment currently needed to reach the midpoint of ARV: 146,746 acres of rangeland, 50,977 acres of forestland, and 10,111 acres of riparian. Vegetative communities that lack the appropriate mix of seral structural stages are at greater risk of insect, disease, and stand-replacing fire.

Generally, under Alternative 1 specific seral structural objectives are not identified, although there is reference to managing toward mid to late seral conditions for all communities. Despite this direction, the primary emphasis of rangeland treatments has, in practice, resulted in early to mid-seral conditions. Also under Alternative 1, treatment emphasis would continue to be on rangeland vegetation settings where juniper is invading. The majority of practicable large landscape burns have been completed. Fire treatments would continue to be focused on large blocks of BLM lands or areas where projects can be done in cooperation with adjacent landowners.

All of the action alternatives provide direction for retaining the appropriate mix of seral/structural stages based on the BpS (see Appendix E and F). Many of the same types of treatments would occur under the action alternatives as under Alternative 1; however, based on vegetation management objectives it would be clearer which stand conditions need to be targeted for treatment to bring whole systems into the ARV. Needs for achieving ARV are also considered within the context of lands adjacent to BLM lands. This would allow the BLM under Alternatives 2-5 to consider the spatial context of the vegetative communities within a larger ecosystem, and consider actions within the light of how ecosystems function across ownerships. In some cases this may mean managing specific seral communities on BLM lands at the high or low end of ARV to accommodate shortages or surpluses in surrounding areas. Managing to within ARV using a more systematic approach under Alternatives 2-5 would result in treatments that are more focused than Alternative 1 on meeting vegetation objectives. This approach would result in vegetative conditions where the types, intensities and response of vegetation after natural disturbance are within acceptable limits.

All of the action alternatives also establish prioritization criteria and a map depicting areas where coordinated interdisciplinary treatments would address the greatest number of resource needs (Map 4). ARV analysis indicates the possibility of delaying burning in some areas until shrub establishment has occurred from past treatments to increase juniper cutting in some areas, and to increase pre-commercial and commercial thinning of forested stands.

### **Rangelands**

Within rangelands, the majority of shrub and juniper BpSs currently have too much early (grass dominated) and late (juniper dominated) seral stages relative to ARV. There is also a deficit in mid-seral communities (e.g., shrub-dominated sites with good graminoid understories that are not being invaded by juniper). Fully developed western juniper woodlands (Phase III) can reduce the understory to the point that herbaceous plants cover less than one percent of the soil surface, and annual grass sites alter the fire regime and compete with native vegetation for moisture.

Under current direction, continued under Alternative 1, efforts to do landscape scale burns have reduced juniper and shrub cover. Most of the sites burned to date have contained mountain or Wyoming sagebrush, species important to the Greater Sage-Grouse. On similar sites, Ziegenhagen (2003) found that percent live canopy cover increased 3.429 times (3.932 to 2.990, 90% CI, p-value  $\leq 0.001$ ) with a doubling of years since fire. Similarly, mean sagebrush densities increased 0.227 shrubs/m<sup>2</sup> (0.267 to 0.188, 90% CI, p-value  $\leq 0.001$ ) with each doubling of years since fire. Much of the current early seral communities can be expected to naturally transition into mid-seral stages, and reduce shortage in this community type over time.

Natural successional processes would, in the absence of fire, continue to increase the number of post settlement western juniper in sagebrush habitats, creating a general homogenization of the landscape. Increased tree cover and density of post settlement trees would occur at the expense of the associated understory vegetation. Increases in juniper cover would increase the amount of exposed mineral soil, especially on south slopes.

Removal of western juniper increases resources (soil moisture and soil nutrients) available for the remaining vegetation (Miller 2005). As cover and density of native herbaceous plants increase so does the sites ability to capture and utilize precipitation and solar energy. The increased spatial distribution of native herbaceous vegetation also increases the potential of fire spread during less extreme fire conditions. More natural fire spread and intensities would extend the time these stands remain in early and mid-seral conditions where herbaceous species dominate opposed to woody species.

Rangeland burns seldom remove more than 50% of the juniper cover. The lack of natural fire under current management direction (Alternative 1) has allowed juniper encroachment on many acres. Prescribed fire treatments across these areas could result in the amount of early seral (lacking shrub cover) being more than that expected under normal burn frequencies. In the past, projects were identified using a variety of methods, often specific to one resource benefit. If current management were to continue under Alternative 1, it is likely that the surplus of early seral rangeland communities would continue to increase and the surplus of late seral communities would decline.

Under the action alternatives, treatment types in rangelands would be similar to Alternative 1 with the exception of the spatial orientation and timing of activities. Activities would be more focused on bringing conditions into

ARV and trending towards FRCC1. Over time this would bring natural disturbance patterns, function, and effects to seral structural conditions more in line with historic fire regimes. Vegetative conditions within ARV and predominantly FRCC1 are a more diverse resilient complement of vegetative conditions across the landscape.

In general, Alternatives 2–5 target areas and treatments that would facilitate fire to achieve resource and protection objectives, which in turn would result in a greater number of woody species dominated acres being treated than Alternative 1. As a result, Alternatives 2–5, in conjunction with the use of BMPs (see Appendix B) would result in less loss of understory vegetation, retention of shrubs in areas currently outside of ARV, and greater treatment through wildland fire.

### **Forestlands**

Within forestlands, current seral conditions show a surplus in the smaller size classes, multi-storied canopies, and later seral species, typically seral class A, B, C, and/or U (Appendix F). The lack of precommercial and commercial thinning if continued under Alternative 1 would result in denser stands with more shade-resistant species compared to Alternatives 2–5. This would subject the remaining large trees to competition stress, risk of insect, disease, and stand-replacing fire, all of which would increase the deficit of large structure and surplus of small structure.

In comparison, under Alternatives 2–5, a greater emphasis would be placed on treatment in priority areas and active forest management of stocking densities. Through time the increased focus of treatment would reduce the risk of stand replacement in dry mixed conifer, pine, and aspen stands, reduce the potential loss of large structure components, and create conditions where fire would reduce ground fuels, prune, and thin stands consistent with the fire regime.

Although similar in the assumed amounts of treatment, targeted treatments to meet ARV objectives and use of Appropriate Response in the action alternatives address far more of the current need than Alternative 1. As shown in Table 4-5, the action alternatives address 31% and 47% more of the current treatment need in rangelands and forestlands respectively over 30 years. Treatment need displayed in Table 4-5 reflects the need to reach ARV mid-point. Actual departure from ARV is displayed in Appendix F. When the continued growth and expanding range of tree species is considered, Alternative 1 has a greater risk of vegetative conditions not being within the ARV.

### **Old Growth Management**

Without specific definitions or management direction to retain or promote juniper woodland and old growth forest, these values would not receive adequate protection. Under Alternative 1, currently only the Baker RMP mentions old growth (see glossary), and very few of the forested acres are within the Baker RMP boundaries, there would be only general direction to retain old growth. There would be no old growth definitions or old growth management requirements. The other plans currently covering the JDB plan area are even more silent on the issue of old growth management.

### **Juniper**

Prior to Euro-American settlement, fire limited the range of juniper. Where post settlement western juniper trees continue to establish and grow in old growth stands, cover and density of western juniper increases. Mortality rates increase due to competition for water and nutrients. The amount of standing and dead woody material also increases. Post settlement understory trees increase ladder fuels and increase the potential for wildfire and thus loss of existing old growth trees.

Rangeland maps currently identify 8,149 acres where old growth juniper trees and stands could be managed.

Although not specified in the existing RMPs, the BLM has recognized the need for old growth management for individual trees for several years. Individual and patches of old growth trees have been left within juniper cuts. Due to the often rocky, harsh nature of old growth juniper sites, loss to prescribed fire is limited. These management actions and trends would be expected to continue under Alternative 1. Under the action alternatives, all rangeland BpSs with a juniper component would require a percentage of those sites to be managed toward or retained in old growth juniper conditions. Additionally, definitions for old growth trees provided under Alternatives 2–5 would increase the likelihood that those trees are retained during treatments.

### **Forested**

Throughout the past and current planning period (1985 to present), large and small diameter trees were both harvested and retained for future forestland habitat. However, due to the current lack of direction, the majority of the forested BLM lands currently have scattered large trees that would meet old growth definitions, but patch sizes are insufficient to meet the definition of an old growth stand. There are currently 252 acres that would meet the old growth stand definition (see glossary). Historic logging practices on surrounding lands seldom retained old growth values. Over the past two decades, retaining large structured forest has become more common, especially on federal lands. These trends would be expected to continue under Alternative 1. The action alternatives provide a definition of old growth trees and stands, seral structural objectives by BpS, and guidance for retention of large trees. See Appendices E and F for existing and desired acres of large structure forest (forested seral classes D, E, and sometimes C).

The action alternatives provide guidance for the desired amounts, types and structural components (e.g., patch size, snags, down logs, etc.) as appropriate for the site. The action alternatives also provide direction for managing insect, disease, and fire to limit the risk of loss of old growth to disturbance.

As described above, the greater emphasis placed on treatment of forested stands in the action alternatives would reduce the potential for insect and disease mortality, competition stress, and stand replacement fire compared to Alternative 1. This combined with clearer old growth retention standards and definitions would result in more forested stands moving toward old growth conditions.

### **Forest Products and Areas Designated for Primary Forest Management**

Under Alternative 1, there are 47,662 acres of forest potential currently in Timber Management Units (TMUs) with a management emphasis on forest health and production, as well as the enhancement of other resources. Juniper products are available on 207,583 acres. There are 23,536 acres of forest potential that are not in a TMU and would likely not have received treatment for forest health under Alternative 1. The current production rate or ASQ for the plan area is an average of 3.58 million board feet (mmbf) per year. However, since 1997 the plan area has fallen short of this rate by 73%, averaging 0.956 mmbf per year (see John Day Basin Analysis of the Management Situation [AMS], p. 139). Forest management would primarily be salvage of dead trees and stands with some treatment in WUI. The lack of proactive treatment across all forested stands would result in overstocked stands, a shift in species composition to more shade-tolerant species, greater risk of drought and fire loss, and an increased time frame to attain old growth conditions or risk of loss of those components.

Following current direction, few commercial or noncommercial permits would be provided under Alternative 1 on an annual basis. When vegetative treatments are applied, efforts would be made to utilize as many products as possible. Road access for noncommercial products would continue in the current state.

Under the action alternatives, there are no areas designated with a timber management emphasis. Under Alternatives 2, 3, and 5, there would be 269,934 acres (195,208 juniper and 74,726 forests) available for forest or juniper products based on an emphasis on forest health with forest products as a by-product. Alternative 4 has 270,208 acres (199,408 junipers and 70,800 forests) available with the same emphasis as Alternatives 2, 3, and 5. Probable Sale Quantity (PSQ) would be 2.54 mmbf per year, and would be available for every 1,000 acres treated. Forest and juniper products would be made available when treatments are applied. Alternatives 2 and 4 remove 66,825 and 75,393 acres, respectively, from product availability. These reductions are based on acres designated as Wilderness or WSA, or managed for wilderness characteristics.

Alternatives 2, 3 and 5 would generate 1.04 mmbf per year less than if Alternative 1 was fully implemented. In the short term, Alternative 4 is expected to generate the same amount of volume as the other action alternatives; however, there would be a slight yearly reduction through time. In addition, restrictions and guidance in the action alternatives would result in fewer large trees being included in the volume. Thus, of the 2.54 mmbf generated in the action alternatives, the material provided would generally be smaller than in Alternative 1. The lack of a large tree component in sale offerings could make the sales less attractive to bidders. If removal of small diameter material is not economical, fuel loads could increase in treatment areas until prescribed fire can be applied.

The action alternatives would allow commercial forest health treatments on more acres than Alternative 1, thus resulting in a potential for greater amounts of treatment to be completed. The primary emphasis toward timber production within the identified TMU in Alternative 1 would result in an increase of small to small saw log size classes with open conditions. Forested lands in the planning area currently have a surplus of these conditions. The increased emphasis on forest treatments for forest health in the action alternatives would reduce surpluses of smaller material and adjust species compositions (generally toward shade intolerant species).

Based on management direction contained in the action alternatives the amount, type, and locations of treatments would accomplish 30 to 50% more of the ARV and FRCC1 objectives than Alternative 1 would. The action alternatives are also more likely to retain or enhance development of unique or limited vegetative conditions such as aspen and old growth.

### **Aquatic Habitat Management Effects on Vegetation**

Under Alternative 1, there would be 51,260 acres that would be managed based on guidelines in PACFISH for Riparian Habitat Conservation Area (RHCA) management. Current PACFISH buffers are 300 feet on each side of fish-bearing streams and 100 feet on each side of non-fish-bearing streams. These buffer widths and the requirement to do watershed analysis have limited, or in most cases precluded, necessary treatments within riparian areas. Currently, most forested and juniper stands within riparian areas have higher than prescribed basal areas (see glossary). Hence, under Alternative 1 forest stand vigor is restricted and forest conditions are more susceptible to insect and disease epidemics, competition stress, stand replacing fires, and a shortage of desired riparian hardwood species.

Under the action alternatives, 139,673 acres would be managed based on guidelines of the Aquatic Conservation Strategy (see Chapter 2). The action alternatives provide specific management direction within the riparian zones on 88,413 more acres than Alternative 1. Objectives, actions, guidelines, and BMPs contained in the action alternatives, such as ARV, address most of the issues contained in watershed assessments from a vegetative standpoint.

The PACFISH guidance requires formal watershed analysis to be completed prior to riparian management, and existing management focuses on avoiding impacts from vegetation treatments. Hence, riparian habitats seldom receive vegetation treatments under PACFISH management direction. The ACS allows for vegetation treatments with ID Team input and prescribes active vegetation management in riparian areas.

All of the action alternatives increase the potential to treat conifers within riparian and terrestrial areas contained within riparian and lentic buffers. Under the action alternatives, treatment in these areas would reduce the risk of disturbance events impacting adjacent terrestrial vegetation, allow for management of riparian and lentic hardwood species, and reduce the risk of losing large conifer trees.

Currently, juniper densities are increasing within riparian areas and are out-competing riparian associated species. Many riparian habitats no longer exhibit riparian characteristics due to water loss and shading. Under Alternative 1 and without treatment, this trend would be expected to continue. Under the action alternatives, treatments would likely target juniper and conifer encroachment on flood plain terraces and lentic areas. These types of treatments would benefit species such as greasewood, basin wild-rye, basin big sagebrush, elderberry, and mock orange.

Shade-tolerant forestland species have drastically increased over the last two decades resulting in overstocked stands, increased fire and drought stress to large trees, and shaded-out riparian species. Under Alternative 1 and without treatment, the loss of riparian species and large structure trees is likely to continue. Under Alternatives 2-5, treatments would likely target shade-tolerant conifer trees in the mid and understory. Treatments in lentic areas may remove all but the large structure conifer. These types of treatments would benefit species such as aspen and cottonwood, two of the species most departed from ARV from the standpoint of their relative abundance. The action alternatives would attain ARV and FRCC objectives better than Alternative 1.

### **Fire and Fuels Management Effects on Vegetation**

Under Alternative 1, there are 22,304 acres designated as WUI. More intense treatments in the WUI area, with the sole objective of reducing fire hazard, would be considered under Alternative 1 than Alternatives 2-5. The

approach under Alternative 1 would meet WUI objectives, but could lead to vegetation conditions that are out of balance across ecosystems. The lack of designated areas for Appropriate Response (including fire to achieve resource and protection objectives) limits that ability to utilize natural fire starts to move stands toward more ecologically intact conditions (FRCC1).

The action alternatives designate 85,391 acres of WUI, 22,304 acres of Suppression, and 434,306 acres of Acceptable Management (AM). With potentially greater funding availability for WUI treatments than in the past, a greater percent of vegetative stands and communities could be treated for both community safety and meeting ARV objectives. Vegetative treatments are required to consider ARV objectives across BpSs at a scale of 20,000 acres minimum. Because of this, vegetative treatment within suppression zones would still be designed to meet ARV objectives across the landscape. Utilization of Appropriate Response to move BpSs toward FRCC1 would also reduce the need to implement other treatments to meet ARV objectives.

Following BMPs and resource objectives, fire to achieve resource objectives is expected to be allowed in grasslands with good native species composition and limited annual grass, shrub and juniper communities where post settlement juniper would be removed, and/or forested understory burns. These types of treatments would result in less shade-tolerant forest species, fuel loading, and late seral species (juniper and shrubs) in rangeland BpSs. These conditions are currently surplus and without treatment are expected to increase throughout the planning area.

The focus approach, increased WUI designation and expected funding association, and the ability to utilize appropriate response and fire to achieve resource objectives in the action alternatives would increase the amount of treatment and ability to meet ARV and FRCC objectives over Alternative 1.

### Livestock Grazing Effects on Vegetation

It is assumed that ungrazed lands will accumulate more abundant and contiguous fine fuels, thus allowing fires to spread and carry through areas where they would not if the fine fuels were grazed yearly. It is assumed that grazing on allotments is considered sufficient to limit the accumulation of fine fuels. It is assumed that reserved forage or closed allotments would either be grazed so infrequently or not at all that fine fuels would be allowed to accumulate. For purposes of analysis it is assumed that all grazing allotment permits would be voluntarily relinquished (see Livestock Grazing, Chapter 2). In practice, since permit relinquishment is voluntary, changes in the categorization of open, closed and reserve forage allotments could vary greatly across the plan area (Tables 4-6 and 2-23).

Under Alternative 1, the majority of allotments are currently in a rest rotation system, so even though they have an active permit, portions of the allotment are ungrazed at times. Herbaceous vegetation accumulations would be on a much smaller scale than what would occur if the entire allotment was not grazed. The majority of allotments are grazed in the dormant season (see glossary), which means that during fire season they typically have current year's growth which retains moisture later into the year than fine fuel buildup that is dead from previous years. Under intense fire burning conditions even recently grazed stands would burn; however, it is assumed that actively grazed allotments would have less fire spread during lower intensity burning conditions due to fuel continuity. In areas of high annual grass concentrations, less fire spread would limit the potential spread and dominance of the annual grasses. In mid-/late seral grass and shrub communities, less fire spread would result in succession to woody species faster than if there were more fire. In forested communities, it can reduce connectivity with ladder fuels, thereby reducing the potential for crown fire in stands with shade-tolerant species in the understory.

**Table 4-6. Acres of Open and Closed Allotments in the plan area if all grazing leases were relinquished.**

	Alternative 1 Acres	Alternative 2 Acres	Alternative 3 Acres	Alternative 4 Acres	Alternative 5 Acres
Open*	395,495	56,382	188,326	182,845	186,711
Close	0	385,692	253,748	259,229	255,363

\* Relinquished allotments in the Open category can be managed as Open or Reserve Forage.

When results of the assumed relinquishment (see Table 4-6) are considered in conjunction with grazing decisions for the North Fork allotments (primarily composed of acquired lands), Alternative 2 would result in the greatest amount of acres not grazed. Alternatives 3 and 5 would have about the same amount of areas ungrazed and Alternative 4 would have slightly more acres closed.

Assuming all allotments are relinquished, Alternative 2 would have the most contiguous areas of no grazing across the landscape particularly associated with the river corridors. This would increase fuel continuity and increase potential fire spread. Increased spread potential would allow for more acres to be treated through AM for resource benefit under the action alternatives than Alternative 1. Increased fire spread would increase the odds that fires would encounter areas with high percentages of annual grass. If allowed to burn, these areas would be expected to have increased annual grass composition and spatial extent. Fuels objectives in the action alternatives call for suppression or AM with point or line control to avoid these areas of high annual grass.

It is impossible to know the number of permits that would be relinquished or the amount of area this would encompass. Fire suppression strategies allowed in the action alternatives and the possibility for increased continuity of fuels would allow more acres to be treated and thus meet ARV and FRCC objectives better than Alternative 1.

### **Special Designations and Wilderness Characteristics Protection Effects on Vegetation**

Wilderness, WSAs, ACECs, RNAs, and Wild and Scenic Rivers (WSRs) and areas managed for wilderness characteristics generally limit the amount and/or type of vegetation treatments. In these designations fire treatments are allowed; however, fire is a less precise tool than mechanical treatments. The ability to specifically target species, size classes, or effect desired change is limited under these special designations. This is particularly true in Phase III juniper and forested stands. Grassland Biophysical Settings (BpSs) are very fire adapted systems and prescribed fire would be sufficient to remove encroaching woody overstory vegetation. Many of the grassland sites are influenced by undesirable annual grasses and fire will exacerbate this condition. Mechanical seeding can re-establish desirable perennial grasses and reduce annual grasses; however, it would be precluded in Wilderness, WSAs, RNAs, and areas managed for wilderness characteristics (in general Alternatives 1, 2, 3, and 5 would allow mechanical treatment whereas Alternative 4 would not as displayed in Table 2-1 in Chapter 2 Wilderness Characteristics).

Under Alternative 1, there are 95,893 acres of VRM Class I (WSA) and no additional areas protected for wilderness characteristics, no new areas of WSR (42,847 existing), and no new ACEC/RNA designations.

Alternatives 2, 3, and 5, would allow mechanical fuels treatment projects with the objective of ecological restoration and long-term restoration of wilderness characteristics. Alternative 4 would not allow mechanical vegetation treatment on approximately 32,536 acres of rangeland habitats and 2,896 acres of forest vegetation. This would result in vegetative conditions that would respond to disturbances in a manner that would likely result in seral structural conditions with excess of early or later seral conditions and increases the risk of uncharacteristic vegetation. In addition, having less mid-seral stand conditions in these areas would not provide typical habitats and would be at greater risk of insect and disease. Vegetation treatments in ACEC/RNAs would not be limited to prescribed fire, but mechanical treatments would be used sparingly to meet objectives. WSRs would require more restrictive logging practices.

Areas designated as WSA and VRM I management would continue in all alternatives and would restrict the use of mechanical treatment. Many of the current WSAs have been experiencing juniper expansion for the last 20+ years (Prineville District Records). These stands are at or moving toward Phase III juniper conditions. Within the last 10 years, the majority of WSAs have been treated with prescribed burns. In general, north aspects that retain more moisture have burned and grass and shrub return has been excellent. Flat and south aspects have in most cases not burned or have grown back with a higher than desired level of annual grass.

Through time, the increase in herbaceous conditions on north aspects may increase the amount of natural fire and further reduce the extent of juniper domination. The more likely case is that as these stands continue to grow, the understory vegetation would continue to decline, thus increasing the fire intensity necessary to support fire spread through the stands. This presents many risks to management. Higher intensity fires are harder to control,

resulting in greater risk to firefighter safety, potential damage to property or structures, excessive fire size, more homogenous burns (reducing stand diversity), and a higher risk of annual grass dominance.

Under Alternatives 2, 3, and 5, there would be 19,442 acres of lands managed for wilderness characteristics, 50,435 acres of WSR, and 6,639 acres of RNAs that would all allow restrictive use of mechanical vegetation treatments. Sensitivity to these values would dictate that these areas be treated using methods that ensure any reductions in areas managed for wilderness characteristics, WSR, or RNA values are temporary and that these areas are protected over the long term. This would increase the costs associated with tree removal and may make the cut material uneconomical to remove. If this is the case, prescribed fire would be needed to reduce fuel loadings to reduce the risk of insects and disease. The effects of VRM Class I (WSA) are the same as those described for Alternative 1. Alternative 4 would manage 35,457 acres for wilderness characteristics and would have the same effects as those described for WSAs for Alternative 1.

The WSR designation proposed in the acquired lands along the North Fork John Day River would allow forest health activities; however, the logging practices may be restricted to meet visual quality objectives. This could limit the feasibility of commercial timber sales, which would reduce the amount of area economically feasible to treat. Untreated stands would have greater potential for stand replacement fire and insect outbreaks with increased risk to adjacent stands in the watershed.

The additional areas allocated for VRM II and WSR, and areas managed for wilderness characteristics in the action alternatives would decrease the likelihood of balancing ARV needs in these areas. Lack of targeted forest health treatments would increase the amount of shade tolerant species and fuel loadings through time adding to the existing surplus of these conditions.

The action alternatives designate more acres than Alternative 1 where the full array of management tools is not available. This increases the difficulty of meeting the vegetative objectives of these areas and balance of ARV objectives across the landscape. Alternative 4 would put the last remaining large structure forests on BLM lands at risk of insects, disease, or fire and has the highest potential for conversion of shrub BpSs to an overabundance of late seral conditions (phase III juniper).

## **OHV Effects on Vegetation**

In general, off road OHV use increases the risk of noxious weed spread. Under Alternative 1, there are 234,272 acres of areas open to OHV use. Under Alternatives 2, 3, 4, and 5, there are 3,971; 4,571; 2; and 0 acres, respectively, open to OHV use. Due to large acreage open to OHVs and its spatial distribution across the plan area, there is much greater risk for the spread of noxious weeds, annual grasses, and invader species to every BpS under Alternative 1 than Alternatives 2–5.

Under the action alternatives, by reducing the size of OHV open areas it would be easier to control noxious weed infestations by preventing OHV users from driving through infested areas and then into uninfested communities. Illegal OHV activity would still be expected, but the amount and distribution of off road OHV use is expected to be much less in the action alternatives than in Alternative 1. Alternative 2 and Alternative 3 pose the greatest risk to loss of vegetative cover in the Rudio Mountain open OHV area. The open area on Little Canyon Mountain (LCM) currently has very minimal vegetation. The level of compaction in the north and south pits of LCM would limit the type and amount of vegetative recovery even under Alternative 5 with no OHV use. Vegetation would be expected to reestablish more completely in both pits under Alternative 5 than the other alternatives; however, it is likely to take 50 plus years to do so without active restoration. Lack of vegetation in the pits occupies less than 5 total acres and is well within the natural variability for openings in stands and thus would not affect the vegetation community's ability to pollinate or cause wind throw.

## **Energy and Minerals Effects on Vegetation**

The action alternatives have a larger percentage of the landscape that are excluded from rights-of-way or mineral entry or require avoidance with stipulations to protect vegetative resources. Alternative 4 has slightly more areas where energy and mineral development would be restricted. Key vegetative communities would receive more protection under the action alternatives making it more likely that limited BpS seral structural communities would meet ARV objectives. Additional acres available for rights-of-way and development in Alternative 1 would

subject more types of vegetative communities to the potential for noxious weed and annual grass expansion associated with road access to sites. Alternative 1 would allow development for energy and minerals and associated rights-of-way in far broader number of plan communities and potential greater amounts of area. This increased potential exposure has the potential to increase fragmentation, add to the spread of invasive species, and limit the types and amounts of vegetation management activities by making it harder to perform prescribed fire adjacent to facilities.

### Lands and Realty Effects on Vegetation

Compared to Alternative 1, the action alternatives would serve to block up lands so that vegetation management is easier, and larger patch sizes can be managed, thus making it easier to achieve vegetation health objectives.

Based on the current parcels in the proposed land exchange associated with the Spring Basin Wilderness, there would be a net loss of annual grass dominated lands and high density juniper but a slight increase in Basin big sagebrush and bunch grass dominated communities.

### Integrated Effects on Vegetation Community Characteristics

Table 4-7 summarizes differences in management direction between alternatives that could affect finer scale vegetation community characteristics.

Alternative 1 only provides general direction for the protection of fine scale community characteristics, while the action alternatives refine the guidance and make it more specific to plant communities and current science. For example, under Alternative 1, management direction for community fuel loading could result in excessive fuel loading in dry forest types and too little down wood in moist forest types. As such, the action alternatives are likely to result in greater protection and maintenance of community characteristics necessary for overall landscape health than Alternative 1. The risk of stand-replacing loss or conversion to invasive species would be lower under the action alternatives. In particular, this direction would increase the potential to attain late and large structure components in the dry forest BpSs and mid-seral conditions in shrub with tree potential BpSs.

### Cumulative Effects

A summary of the reasonably foreseeable actions is included at the beginning of this chapter. Future management on BLM, Forest Service, State, private and other land is assumed to be very similar to current management. The Forest Service Schedule of Proposed Actions (SOPA) is indicative of the types of management actions likely to continue into the future throughout the plan area. The majority of vegetative treatments include thinning from

**Table 4-7. Summary of Differences in Management Direction Between Alternatives That Could Affect Vegetation Community Characteristics.**

	Alternative 1	Action Alternatives
Biological soil crusts	Provides evaluation criteria for biological soil crusts in the Rangeland Standards and Guides but contains no Standards or BMPs.	Provides BMPs for the retention and restoration of biological soil crusts.
Leave islands and patches	Requires 4.5% of treatment areas to be left untreated for wildlife cover and provides general direction to create diversity and uneven edges.	BpS descriptions provide patch size and leave island guidelines.
Fuel loadings	Current plans provide fuel loading BMPs that are not specific to vegetative communities.	Proposes fuel loadings specific to tree dominated communities, including size class requirements, such as large woody debris needed for wildlife.
Canopies and % cover	Current plans provide no direction for number of canopies or % canopy closure.	BpS descriptions provide appropriate canopy numbers and canopy closure ranges.
Snags	Manage at the 60–70% of Viable Populations.	Proposed direction provides snag sizes, types, and amounts specific to plant community (see Appendix S).

below, underburning, small forest products (post, poles, and firewood), salvage, hazard tree removal, noxious weed treatment, and juniper reduction. The majority of forest lands in the plan area are administered by the Forest Service (Ochoco, Malheur, and Umatilla National Forests). Vegetation management direction for the Forest Service is very similar to BLM. The trend for forested vegetation would be the reduction of sapling to small log size material generally from the understory. This should help the plan area as a whole move toward ARV.

Private land treatments are similar; however, more of the large structure trees are removed. Private land managers will in general continue to recover the value of dead and dying timber consumed in wildfires.

Effects of global warming specific vegetation in the John Day Basin Planning Area are difficult to quantify. While making an assumption that average temperatures will rise slightly is within reason, it is very difficult to predict how this would impact the jet stream and moisture patterns in the planning area. The majority of vegetative conditions are dictated by moisture, shade, and soil conditions. A recent Forest Service study determined that fire seasons are becoming longer. This combined with warmer temperatures would increase the risk of stand-replacing fires or insect and disease in overstocked forested stands. It would also increase the risk of the spread of annual grasses. The action alternatives place an increased emphasis on maintaining vegetative conditions within an acceptable range and allow management flexibility to make adjustments to landscape level vegetative balances. This monitoring should indicate climatic changes are impacting a particular BpS in a negative fashion. The action alternatives also allow the use of appropriate response for wildfire that is expected to increase the amount of area managed within a normal disturbance cycle and thus reduce the potential impacts of climate change relative to Alternative 1.

Alternative 1 proposes to manage vegetation communities in a mid- to late seral condition; however, if local prescription and temperature patterns shift significantly this may not be possible. It is expected that current trends, such as larger and more intense wildfires and insect and disease outbreaks, would continue to worsen if global climate change impact local moisture and temperature regimes.

Additional limits to the types of tools allowed for treatment in Alternative 4 wilderness characteristic areas have the potential to reduce treatment effectiveness, which would increase competition stress, particularly if climate change does alter precipitation and temperature regimes. Climate change could also make the use of prescribed fire more difficult due to increased fire spread risks, expansion of invasive species, and moisture limitations may impact sites ability to revegetate following fire.

Management objectives such as ARV are landscape scale objectives. These objectives are more likely to be attained in areas where surrounding lands are managed with similar objectives. Because the U.S. Forest Service lands are managed with very similar objectives to BLM lands, it is more likely that vegetative objectives can be met at a landscape scale in the North and South Forks of the John Day River.

## **Special Status Plants**

### **Introduction**

Analysis of the environmental consequences of the alternatives on areas with Special Status Plants considered the following key resources or resource uses: Vegetation (noxious weeds), Fire and Fuels, Wild Horses, Lands with Wilderness Characteristics, Special Designations, Livestock Grazing, and Recreation Opportunities (OHV use).

Unless discussed below, actions proposed under any of the alternatives would have no effect on Special Status Plants. Established protocols and procedures, as outlined in preceding chapters and listed as Best Management Practices, would result in the protection of known Special Status Plants during implementation of projects and would help to ensure there is not a trend toward Federal listing. Ongoing activities (for example, livestock grazing and OHV use) could have an effect on plants, whether or not sites were identified.

Indicators of effects to Special Status Plants include number and acres of sites (percent of suitable habitat occupied) and number and vigor of individuals per site (reproductive health). For most sites, the size in acres is not a good measurement of effects, as most sites are small and significantly less than one acre in size. Exceptions would be some sites of transparent milkvetch.

## Special Status Plants Assumptions

- Established weed control protocols would be followed (with botanical surveys prior to treatment) and a reduction in noxious weeds would be beneficial for native plants onsite (BLM 2007).
- Control lines for fire and fuels management would utilize existing roads and/or topography; no mechanical surface disturbance would occur.
- A resource advisor would be employed during any action requiring construction of control lines, fire camps, helipads, and other fire management activities.
- For the three Special Status Plant species documented in the plan area, fire is believed to be compatible (in the case of arrowleaf thelypody, documented), if not beneficial (Special Status Plant monitoring records on file in the Prineville District Office).
- Removal of increasing western juniper and other woody vegetation from a site could be beneficial to the remaining herbaceous species on site, depending on site selection, control methods, and follow-up management (OSU 2005).
- Special Status Plant conflicts with wild horses are limited to the Murderer's Creek HMA. The effects of wild horse use include both the grazing of plants and soil disturbance through trailing. Horses would be managed to the AML established for the HMA (Special Status Plant monitoring records on file in the Prineville District Office).
- Management of an area for wilderness characteristics would limit ground disturbances in these areas.
- Special Status Plants could be protected through designation of an area as an ACEC if there were restrictions on activities that were detrimental to Special Status Plants. Designation of an area for its visual quality would restrict surface-disturbing activities.
- The timing, intensity and duration of livestock grazing are not expected to be increased beyond current levels. Dwarf evening-primrose and transparent milkvetch are not normally affected by grazing so much as by trailing, loafing, or salting. Arrowleaf thelypody is palatable to livestock and inhabits stream/riparian areas, and is therefore highly susceptible to grazing impacts (Special Status Plant monitoring records on file in the Prineville District Office).
- The OHV use in the plan area is likely to increase over the next 10 years.
- The OHV use in a plant site is detrimental to that site; designation of open "play areas" would result in an increase in off-site OHV use unless tightly monitored; limiting OHV use to designated routes would decrease OHV use on plant sites, assuming there is vigorous compliance.

## Analysis of the Effects of the Alternatives on Special Status Plants

### ***Noxious Weed Management Effects on Special Status Plants***

Noxious weeds threaten all native plant communities and have been documented in many Special Status Plant sites. Under all alternatives, noxious weeds would be aggressively controlled where they occur in Special Status Plant sites, and there are no substantial differences in effects between alternatives. In the short term, aggressive control could result in "collateral loss" to plants that may be inadvertently sprayed or otherwise impacted. Based on past experience, which included spot treatment of individual weeds, shielding of adjacent Special Status Plants from chemicals, and using manual techniques as opposed to chemical treatment where feasible, it is estimated that less than one percent of the Special Status Plants at any one site would be affected. In the long term, there would be an increase in all indicators, especially those relating to the reproductive health of plants in affected sites under all alternatives. At the present time, only arrowleaf thelypody sites appear to have noxious weed issues.

### ***Fuels Management Effects on Special Status Plants***

In most cases projects are surveyed prior to implementation of fuels management projects, so documented plant sites can be protected or managed as needed, especially for mechanical treatments. Under all alternatives, concerns relate to the effect of fire treatment on plant sites not discovered during inventory.

Under all alternatives fuels management projects would continue. Due to the scarcity of fuels in transparent milkvetch and dwarf evening-primrose sites, it would be unlikely that any treatments would have an effect on these species. For arrowleaf thelypody the situation is different. Numerous sites, perhaps 40 of the 46 existing

sites, (60 of the 74 occupied acres), have a buildup of woody species that need to be reduced either through mechanical means or by fire. Under all alternatives, treatment of these sites would result in an increase in number of plants per site and an increase in reproductive health. In some cases additional historic habitat would be released, resulting in the re-establishment of plants and increasing occupied habitat by 25% to about 90 acres. The action alternatives (Alternatives 2–5) may have greater positive effects on Special Status Plants than the no action alternative (Alternative 1) based on the greater number of acres planned for fuels treatment under the action alternatives (see Table 4-5).

### ***Fire Management Effects on Special Status Plants***

Under all alternatives, the effects of fire management on Special Status Plants would be similar to those resulting from fuels management. Assuming protocol is followed, associated surface-disturbing actions would have no effect on Special Status Plants; however, unknown sites could be damaged. There is no way to estimate how many unknown sites might be damaged through surface-disturbing (non-fire) actions, but it would likely be less than one percent of all existing sites under all alternatives. Since these sites are not documented previously, there would be no way to assess if they would be affected by fire management activities in any case.

### ***Wild Horse Effects on Special Status Plants***

Under all alternatives, the number of horses in the Murderer’s Creek HMA would be reduced to the established AML. This would result in a decrease of horse use in transparent milkvetch sites, primarily related to trailing, which would cause an increase in plant reproduction. While all 22 known BLM transparent milkvetch sites are likely accessible to these horses, horse use has been documented on 4 sites totaling about 69 acres. At least these four sites would be affected and it is likely a number of undocumented sites would benefit as well, with perhaps 20% of the sites (both documented and undocumented) receiving less use by horses. No substantial differences in effects of wild horses on Special Status Plants are likely between alternatives.

### ***Wilderness Characteristics Effects on Special Status Plants***

Of the areas proposed under the action alternatives for protection of wilderness characteristics, only the Clark Canyon area is known to contain Special Status Plants, with four known sites of arrowleaf thelypody, totaling about eight acres. Under Alternative 1, with no direction for management of areas with wilderness characteristics, these sites would continue to be vulnerable to surface disturbing activities although none are threatened at the present time. Managing areas for their wilderness characteristics under the action alternatives would provide additional protection for these sites since surface-disturbing activities would generally not be allowed. Any increase in non-motorized use would likely have minimal effects on Special Status Plants since the sites are remote and difficult to access.

### ***Special Designations Effects on Special Status Plants***

For ACECs that are currently designated under Alternative 1, there are no impacts to Special Status Plants, because Special Status Plants are not known or suspected in these areas. Under the action alternatives, designation of the Black Canyon ACEC/RNA and subsequent elimination of livestock grazing from this area would provide some additional protection for 6 sites (14 acres) of arrowleaf thelypody, or approximately 13% of the known BLM sites. Since this area is not now grazed to any large degree, the actual short-term benefits to the populations would be expected to be minor. However, in the long term these sites would be assured of continued protection from grazing. At the present time, approximately 60 sites of arrowleaf thelypody are documented worldwide (Vrilakas, pers. comm.), with only one fenced from livestock grazing, and so protection of these six sites would be noteworthy. Additional sites within the Painted Hills CAMP of the John Day Paleontology ACEC would not be affected through this designation since this ACEC is not proposed to protect plants. Additionally, a large portion of the proposed CAMP includes the existing Sutton Mountain WSA, which contains numerous plants that would benefit from Interim WSA Management. Special Status Plants are not known for the other ACEC proposals under the action alternatives.

### ***Livestock Grazing Effects on Special Status Plants***

Of the 74 documented Special Status Plant sites in the plan area, only one (an arrowleaf thelypody site) has been observed to be in a downward trend related to livestock grazing, and the impacts have been caused primarily by loafing. These impacts would likely continue under all alternatives unless this site was fenced. Management direction under all alternatives calls for taking action to avoid listing of sensitive species. For all other sites,

grazing would continue to have no discernible impacts, although it is unclear if livestock grazing is affecting the ability of certain sites to expand into adjacent, suitable habitat.

Under Alternatives 2, 3, and 5, certain allotments are designated to be closed if the lease is relinquished (ILR). This would affect 17 allotments containing 57 documented Special Status Plant sites (22 transparent milkvetch, 1 dwarf evening-primrose, and 34 arrowleaf thelypody). Removal of livestock grazing from these sites would have no effect on transparent milkvetch or dwarf evening-primrose since these plants are not in sites normally grazed by livestock. Since most of the arrowleaf thelypody sites are in situations where livestock grazing is not a factor (i.e., sites are generally inaccessible to livestock or only lightly grazed), there are likely to be no effects to these sites. However, it is probable that removal of grazing from these allotments would allow re-establishment of arrowleaf thelypody in at least some habitat that is not now occupied due to existing grazing pressure. Conceivably the amount of occupied habitat in these allotments could more than double, from an existing 44 acres to 100.

Under Alternative 4, 17 allotments containing special status plants would be closed if the grazing permit were relinquished (IPR), affecting 57 documented sites, (22 transparent milkvetch, 1 dwarf evening-primrose, and 33 arrowleaf thelypody). Although two more arrowleaf thelypody sites would likely be protected from grazing under Alternative 4, the impacts would be nearly identical as for Alternatives 2 and 3.

### **OHV Use Effects on Special Status Plants**

Under Alternative 1, OHV impacts (off-highway vehicles used off-road) would continue on affected plant sites and likely increase at others. At the present time, two sites have been documented to have current OHV use: a small (< 1 acre) site of arrowleaf thelypody near Kimberly, and a larger (12 acre) site of transparent milkvetch along the South Fork John Day River. OHV use in the arrowleaf thelypody site is primarily related to an OHV trail crossing the drainage. However, due to the transparent milkvetch's preference for open, gravelly slopes, its habitat is ideal for OHV use, at least from a recreational perspective, and OHV use would likely continue or even increase under Alternative 1. Approximately 250 acres, encompassing 12 sites, would remain threatened with OHV use. This is approximately 72% of the documented habitat of this species.

The action alternatives would at least restrict OHV use to existing roads and trails in the South Fork area. Even though many of these sites are adjacent to such routes, OHV threats to transparent milkvetch would be less under the action alternatives than under Alternative 1 assuming user compliance and agency enforcement.

Two recreation areas designated under the action alternatives would potentially affect Special Status Plants in the plan area. The Clark Canyon area, a subunit of the Bridge Creek SRMA, would be closed to OHV use under the action alternatives. This would help to protect four sites (12 acres) of arrowleaf thelypody known in the area.

Also proposed under the action alternatives are one or more Class II technical rock crawling areas immediately north of the John Day River between Service Creek and Kimberly. These proposed technical areas are presently open to OHV use and as a result there are isolated, ongoing impacts to plants as noted for Alternative 1. These areas would be designated as limited to designated routes under the action alternatives. Depending on which areas would be designated, up to 15 known arrowleaf thelypody sites (approximately 29 acres) could be affected. Due to the technical designation and resultant increase in public use, illegal OHV use would be expected to increase in the vicinity of these areas under the action alternatives. If OHV compliance was closely monitored, plant sites would likely be more secure under the action alternatives since under Alternative 1 the areas are "open."

### **Cumulative Effects**

Implementation of any of the action alternatives would result in positive cumulative effects to Special Status Plants. These effects would be directly related to an increased number of plant sites protected from livestock grazing, OHV use, and other activities, as well as enhancement of sites through fuels treatments.

## Invasive Plants

### Introduction

Analysis of the environmental consequences of the alternatives on invasive plants (noxious weeds) considered the following key resources or resource uses: Vegetation, Aquatic Resources, Wilderness, Livestock Grazing, Recreation Opportunities (OHV use), and Travel Management.

Indicators used to compare environmental consequences between alternatives include: potential for, or resistance to weed introduction and spread.

### Invasive Plant Assumptions

- Management of noxious weeds will take the same approach for all alternatives.
- The risk for expansion of weed infestations will be commensurate with the amount of disturbance on the landscape, which will vary among alternatives. For example, if more acres of vegetation rehabilitation are contemplated using mechanical treatments such as seeding or non-mechanical treatments such as prescribed fire, the potential for weed expansion will increase.
- Alternatives that include more restrictions on weed control activities will likely result in the reduction in the efficiency and effectiveness of treatment methods.
- Special area designations that restrict available weed management tools, such as motorized access, will also likely result in the reduction in the efficiency and effectiveness of treatment methods.
- Recreational use of OHVs will serve to expand weed infestations. Alternatives that restrict the area available to OHV use will have a lower potential for weed expansion than those in which larger areas are available for OHV use. Off-highway vehicle use increases the potential for weed expansion both within "Open" OHV areas and outside them.
- Surface disturbance from mineral extraction increases the potential for weed expansion. This type of surface disturbance necessitates weed control measures in Plans of Operation with related increases in costs.
- Traditional plant gathering areas could be adversely impacted by weed control activities if these areas are not fully identified prior to treatment.
- Wildlife can disperse invasive plants by ingesting seeds that can pass through the animal's digestive system unaffected, or by seeds becoming tangled in the hair or coat of the animal. Both methods allow invasive plant seeds to be transported to new areas (Sheley *et al.* 1996). Little can be done to prevent wildlife from spreading weed seeds other than to control seed sources. This can be done by limiting the spread of weeds through other vectors and treating known weed locations.
- Projected acres of noxious weed treatment by alternative are not quantified since current inventories of noxious weeds are incomplete.

### Analysis of the Effects of the Alternatives on Invasive Plants

#### **Livestock Grazing Effects on Invasive Plants**

Livestock can disperse invasive plants by seeds becoming tangled in the hair or coat of the animal, or by ingesting seeds that can pass through the animal's digestive system unaffected. Both methods allow invasive plant seeds to be transported to new areas (Sheley *et al.* 1996). Livestock grazing can be used to help manage invasive plants when incorporated into an integrated weed management plan. Managing season of use, stocking density, and grazing intensity can target invasive species (e.g., early season grazing in cheatgrass-infested rangeland) (Frost and Launchbaugh 2003). All alternatives provide for prescribed livestock grazing to control weeds. Even though livestock can contribute to the introduction and spread of invasive plants, absence of grazing does not preclude lands from problems with invasive species. While healthy native plant communities are important for greater site resistance to invasive plant establishment and expansion, research conducted on spotted knapweed determined that defoliation of grasses (grazing) was not required for the invasive plant to become established and that the establishment was not accelerated by moderate defoliation of native grasses (Sheley and Jacobs 1997). This may only be true for knapweed and this study cannot draw conclusions on other invasive species.

Alternative 1 would have the most acres open to grazing regardless of whether grazing leases are voluntarily relinquished. For the action alternatives, if no voluntary relinquishment of grazing leases is assumed, Alternative 3 would have the most acres open to livestock grazing followed by Alternatives 2, 5, and 4 respectively. If voluntary relinquishment of grazing leases is assumed, Alternative 2 would have the lowest number of acres open to livestock grazing followed by Alternatives 4, 5, and 3 respectively.

### **Travel Management and OHV Effects on Invasive Plants**

Roads and trails create edge habitats that may extend up to 200 meters from the road or trail edge. The impermeable surfaces of roads and OHV trails shed precipitation, increasing the available moisture in the adjacent areas (Ouren *et al.* 2007). Invasive plant seeds are often carried in undercarriages of vehicles and fall from the vehicles as they are driven down the roads or trails (Sheley *et al.* 1996). These seeds are dispersed to the favorable edge habitats. As a result, edges of roadways and trails commonly support invasive plants that can be transported by other vehicles using these routes.

The effects of the interim transportation system on invasive species would vary by alternative. The fewer miles of open roads, the lower the potential for weed infestation and spread. Alternative 3 has the highest number of open miles (879 miles), followed by Alternative 1 (742 miles). These alternatives would have a greater potential for increases in weed infestations than Alternatives 2, 4, and 5, which all have about 333 miles of interim roads. Although roads increase potential for weed infestation and spread, they also provide access for treatment efforts. Having fewer roads reduces treatment efficiency.

The OHV travel also serves as a vector for the spread of invasive plants. Areas designated as Open allow vehicle travel anywhere in the designated area, on or off-road. Traveling off-road allows seeds that are in the undercarriage of vehicles to be deposited cross country. Areas designated as Open are at higher risk of invasive plant establishment and spread than those designated as Limited or Closed. Areas designated as Limited restrict effects to route corridors. Areas designated as Closed would have the lowest potential for infestation and spread of invasive plants due to low use in these areas. Alternative 1 has the greatest probability for the spread of invasive plants. Alternative 1 has the greatest number of acres designated Open (234,272 acres) and the lowest number of acres designated Limited (155,228 acres) and Closed (67,332 acres). All action alternatives reduce the acres designated as open by at least 98% as compared to Alternative 1. Alternative 5 has no acres designated as open and Alternative 4 only designates two acres as open. All action alternatives have more acres designated limited and closed than Alternative 1. Alternative 4 designates the greatest number of acres as closed (155,325 acres). While trails increase potential for weed infestation and spread, they also provide access for treatment efforts. Having fewer trails reduces treatment efficiency.

In the Little Canyon Mountain (LCM) area, Alternative 1 poses the greatest risk for the infestation and spread of invasive plants. Under Alternative 1, the LCM area would be designated as open, allowing for off-road transport of invasive species. Alternatives 2, 3, and 4 would designate the LCM area as limited. Limiting travel to designated routes restricts the infestation and spread of invasive plants to route corridors. Alternative 5 would designate the LCM area as closed. All BLM-administered roads on Little Canyon Mountain would no longer allow public use. This does not include the County or Forest Service trailhead access road. Alternative 5 would have the lowest potential for infestation and spread of invasive plants due to a lower volume of vehicles traveling the designated routes. However, risk still exists because routes would continue to be traveled, and effects would be similar to Alternatives 2, 3, and 4.

The North and South Pits of LCM would continue to be used in all alternatives (designated as Open in Alternative 1 and Limited in Alternatives 2–4) except Alternative 5 (designated as closed). These pits currently have very minimal vegetation. The high level of compaction in the North and South Pits of LCM limit the type and amount of vegetation present. Vegetation would be expected to continue to be scarce in the pits with continued disturbance (Alternatives 1–4). Since the pits are highly disturbed areas, they are more susceptible to invasive species. If OHV use is sufficient in open areas it is possible that populations would not be able to establish due to repeated disturbance. If vegetation establishes at all, it would be expected that small populations of invasive species would be present in the pits under Alternatives 1–4. Vegetation would be expected to reestablish more completely in both pits under Alternative 5. However, without active restoration it can be expected that reestablishment would be slow, and may result in the establishment of large populations of invasive species in the pits since invasive species tend to thrive in disturbed areas and many times outcompete native species. Due to

the small size of the pits, less than 0.1% of the LCM area, spread of invasive species from populations in the pits would be isolated, unless carried from the pit by a vector.

### ***Vegetation Management Effects on Invasive Plants***

Tools available for vegetation management include prescribed fire, seeding, mechanical treatments, and/or chemical treatments. Any disturbance caused by vegetation treatments creates the risk of generating open sites for invasive plants. The resulting increase in nutrients, water, and sunlight following treatments allows invasive annual grasses, such as cheatgrass and medusahead as well as other invasive plant species, to flourish. Their establishment can hinder establishment of deep-rooted perennial grasses (Barret 2007). Seeding sites already dominated by annual grasses or other invasive plants would help mitigate establishment of undesirable plants by providing a large seedbank of desirable plants to capture newly released resources on the site immediately following treatment.

Vegetation management is designed to improve ecological condition and function of treatment areas. After a post-project period of stabilization, improved condition on treated sites would provide the site with greater resistance to invasive plant establishment and expansion. Under Alternative 1, it is assumed 108,000 acres would be treated in the next 30 years. The action alternatives assume 177,000 acres would be treated in the next 30 years. The action alternatives expect to treat more acres than Alternative 1, resulting in a greater potential for the introduction and expansion of invasive plants. The action alternatives also have a greater potential for improved ecological condition and function, which provides greater resistance to invasive plants, than Alternative 1.

### ***Special Designations and Wilderness Characteristics Management Effects on Invasive Plants***

Motorized traffic is restricted in Wilderness Areas, WSAs, and areas managed to maintain wilderness characteristics. Wilderness Areas are closed to motorized use. In WSAs and areas where wilderness characteristics are protected, motorized use is restricted to designated routes. The efficiency and effectiveness of weed treatments decreases as motorized access decreases. All alternatives have 6,411 acres of designated Wilderness and 89,428 acres of designated WSAs. Alternative 1 limits management of wilderness characteristics to previously designated Wilderness Areas and WSAs. Alternatives 2, 3, and 5 identify 19,442 acres for the protection of wilderness characteristics. Alternative 4 identifies 35,457 acres for the protection of wilderness characteristics. Weed management efficiency and effectiveness would be more restricted in the action alternatives than Alternative 1 because of additional acres with restricted motorized access through areas managed to protect wilderness characteristics.

### ***Aquatic Resources Effects on Invasive Plants***

Invasive plant treatments in riparian and aquatic ecosystems are more restrictive than upland treatments. Additional BMPs are provided in Appendix B to ensure non-impairment of water quality, soil productivity, or locally important fish. Treatment restrictions do not vary between alternatives, but all action alternatives specifically address invasive plant management calling for cooperation with County Weed Boards and Soil and Water Conservation Districts to target noxious weeds in riparian areas. Alternative 1 does not specifically address invasive plant management.

### ***Cumulative Effects***

Invasive plant management on adjacent private, Forest Service, State, and other land affects BLM lands. The Forest Service has a noxious weed treatment program. The treatment of noxious weeds on adjacent lands reduces seed sources that could potentially be spread to BLM lands. If private land managers control noxious weeds on private property, seed sources can be prevented from spreading onto BLM lands. If private land managers do not work to control noxious weeds on private property, invasive plant species will continue to invade into adjacent public lands. Many private land managers are taking a proactive approach to prevent the spread of weeds and treat known sources of invasive species by working with the local county Weed Control Specialists, Soil and Water Conservation Districts, and Weed Management Areas.

The effects of global warming specific to invasive plant species in the John Day Basin planning area are difficult to quantify. While making an assumption that average temperatures will rise slightly is within reason, it is very difficult to predict how this would impact the jet stream and moisture patterns in the planning area. A recent

Forest Service study determined that fire seasons have been becoming longer. This combined with warmer temperatures will increase the risk of stand-replacing fires or insect and disease in overstocked forested stands. It will also increase the risk of the spread of annual grasses and other invasive species.

With warming temperatures, native plants would be expected to make an upward elevational migration. If conditions warm too quickly, native plant species may be lost from their lower elevation limits faster than they can migrate upward into their new habitat. This would potentially result in an increase in unused resources that would then be available to invasive plant species (Tausch 2008).

## Fire and Fuels

### Introduction

Analysis of the environmental consequences of the alternatives on fire and fuels considered the following key resources or resource uses: Air Quality, Fuels, Wildlife, Lands with Wilderness Characteristics, Visual Resources, Special Designations (RNAs), Recreation Opportunities (OHV use), Access and Travel Management, and Lands and Realty. Livestock grazing effects on fuels are discussed in the Vegetation section of this chapter.

Indicators used to compare environmental consequences between alternatives include: risk of uncharacteristic fire, area proposed for treatment, opportunities for the use of fire to achieve resource objectives, access for mechanical fuel treatment, amount of prescribed fire or suppression, fire hazard, fuel loading, risk of uncharacteristic fire, and potential for human-caused ignitions.

### Fire and Fuels Indicators and Assumptions

- **Risk of uncharacteristic fire from fuel loading (Fire Regime Condition Class or FRCC).** Fire is a natural process; exclusion of fire may result in continued accumulation of fuel leading to fires with uncharacteristic behavior and effects. Changes to native plant communities from past management actions such as fire suppression, road building, agricultural and urban conversion of wildlands, timber harvest, and grazing have all contributed to the current altered fire environment. As fuel loads increase, so does the risk of fire. However, it is not desired, nor possible to restore every acre of federal land within the plan area to a Fire Regime Condition Class 1. In some areas, managing for FRCC 2 and 3 vegetative structures meets other resource objectives. None of the alternatives would eliminate wildland fire from the ecosystem.
- **Area proposed for treatment.** Restricting the use of treatments would limit the reduction of hazardous fuels. Increasing the area of treatment increases the area attaining fire and fuels objectives.
- **Opportunities for the use of fire to achieve resource objectives.** Levels of treatments proposed through the use of fire to achieve resource objectives may vary considerably from year to year, as the frequency and occurrence of unplanned fire starts in a given year is unpredictable. Response strategies will be guided by many variables including but not limited to weather, national and local preparedness levels, time of year, fuel conditions, and line officer approval.
- **Amount of fuels treatment.** Averaged across the plan area, decreases in accessibility would decrease the likelihood of mechanical fuels treatment. Increased restrictions would decrease the likelihood of fuels treatment. Choices about how to access and prioritize fuels restoration and maintenance projects involve considering multiple objectives at the landscape scale, including reduction of risk at the WUI, and enhancing or maintaining sustainable habitats, watersheds, visual resources, and recreational, social and economic opportunities.
- **Amount of WUI acres.** The WUI currently occupies 85,391 acres of BLM land in the plan area, and it is expected to continue its expansion. The WUI acres within the plan area are expected to increase with new rural housing development.
- **Flame length and fire hazard.** Flame length is an indicator of fire hazard. This analysis assumes ground suppression forces can operate safely adjacent to flames that are 4 feet in length or less. Extreme fire behavior, including crown fire, rapid surface spread, and long-range spotting, creates an unsafe

environment for firefighters and the public. Fuels treatments on federal lands alone will rarely improve the chances for safe and successful community protection 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 community protection 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.

- **Potential for human-caused ignitions.** Maintaining or designing a vegetative environment that reduces fire hazard, including species and structural characteristics will produce safely manageable fire behavior in the event of an unplanned ignition.

## Analysis of the Effects of the Alternatives on Fire and Fuels

### Effects Common to All Alternatives

Proposed management of the following resources and resource uses are not anticipated to have impacts to fire and fuels: Aquatic Resources, Wild Horses, Cave Resources, Native American Uses, Paleontological Resources, Cultural Resources, Energy and Mineral Resources, and Lands and Realty.

### Fire and Fuels Management Effects on Fire and Fuels

Approximately 97 percent of BLM-administered lands within the plan area currently fall into an FRCC of 2 or 3, as estimated using local data and the LANDFIRE FRCC Mapping Tool.

Under Alternative 1, prescribed fire would be carried out with an approved burn plan, but there would not be any direction for targeting the location of fuels treatments or how to prioritize fuel treatments. If all fires are fully suppressed, as specified under Alternative 1, fuels would continue to build up and increase the risk of uncharacteristic wildfire. Managing unplanned ignitions to achieve resource objectives would not be an option in Alternative 1. Under Alternative 1, treatment of approximately 3,600 acres of BLM land per year (see Table 4-5) would move the Fire Regime Condition Class from a 3 or 2 toward a 2 or 1, or maintaining acceptable fire regime conditions. Under Alternative 1, fire suppression efforts would reduce the area of fuels treated by naturally ignited fire.

Under Alternatives 2–5, treatment of approximately 5,900 acres of BLM land per year (see Table 4-5) would move the Fire Regime Condition Class from a 3 or 2 toward a 2 or 1, or maintain condition class. Less aggressive responses to wildfires, including fire to achieve resource objectives would be implemented. Fuels treatment prioritization criteria in Alternatives 2–5 seek to identify areas where vegetation treatments would allow the full array of appropriate responses of managing wildfires. As this approach is applied, the opportunity for treatment through wildfire would increase.

Table 4-8 displays differences between alternatives in the amount of the plan area zoned into three fire management categories: Wildland-Urban Interface (WUI), Suppression, and Appropriate Response. Under Alternative 1, full suppression would be implemented for all wildfire ignitions on BLM lands, whether they fall within the WUI or not. Under Alternatives 2–5, a “Suppression Zone” has been identified around communities and improvements. This includes, but is not limited to, areas that have developed a Community Wildfire Protection Plan (CWPP) and incorporates areas identified by the State of Oregon as WUI. The area in WUI is larger under Alternatives 2–5 than Alternative 1. Under Alternatives 2–5, broader definition of WUI, prescribed

**Table 4-8. Suppression Strategies by Zone.**

Category*	Zone Size (Acres)	
	Alternative 1	Alternatives 2-5
Wildland-Urban Interface**	22,304	85,391
Suppression Zone	N/A	22,304
Appropriate Response Zone	N/A	434,306

\* Categories are not mutually exclusive and may not cover the entire plan area.

\*\* Wherever residential, industrial, or agricultural structures are located within or adjacent to trees and other combustible vegetation.

fire, mechanical treatments, and fire to achieve resource objective could be used to restore fire's ecological role and reduce fire hazard to communities. The increased area of appropriate response zone under Alternatives 2–5 would increase the opportunity for a full array of responses when wildfires occur.

Table 4-9 and Figure 4-1 display the output from the FlamMap Model (Finney *et al.* 2004) for flame lengths for BLM lands and the entire planning area (all ownerships). The table displays the current situation as well as the projected fire hazard for the year 2037 for each alternative. This analysis assumes that prescribed fire treatments would reduce anticipated flame lengths by one category, and that mechanical treatments (i.e., in forest fuels) would reduce the flame length by two categories. Rangeland prescribed fire treatments would occur in category 4 and forest prescribed fire would occur in category 3. Appropriate Response (proposed in Alternatives 2–5) would be implemented evenly across the flame length categories of 3 and 4 (2–4 feet and 4–8 feet respectively). Mechanical treatment in the forest type would be spread between categories 4, 5, 6, and 7. Mechanical treatment in the rangeland would not alter fire hazard.

Based on proposed levels of fuel treatments (see Table 4-5), all alternatives would similarly reduce fire hazard (flame lengths) across BLM lands in the plan area. By the year 2037, flame length categories 1–3 (< 4 feet) would be 59% and 69% for Alternative 1 and the action alternatives, respectively.

### Air Quality Effects on Fire and Fuels

Air quality restrictions are similar across all alternatives and may cause some short-term delays in the implementation of fuels projects. However, they are not expected to reduce the area of fuels treatment.

### Research Natural Area Designation Effects on Fire and Fuels

Under all alternatives, prescribed fire treatments would be allowed in RNAs, but under more stringent conditions than elsewhere. More stringent conditions may increase the difficulty of implementing a prescribed burn within or near an RNA. Most of the RNAs exist in preexisting WSAs (Wilderness Study Areas) that already prohibit the use of mechanical treatment. Since the action alternatives designate greater area as RNA (6,639 acres), slightly less area may be treated under Alternatives 2–5 than Alternative 1.

### Wilderness Characteristics Effects on Fire and Fuels

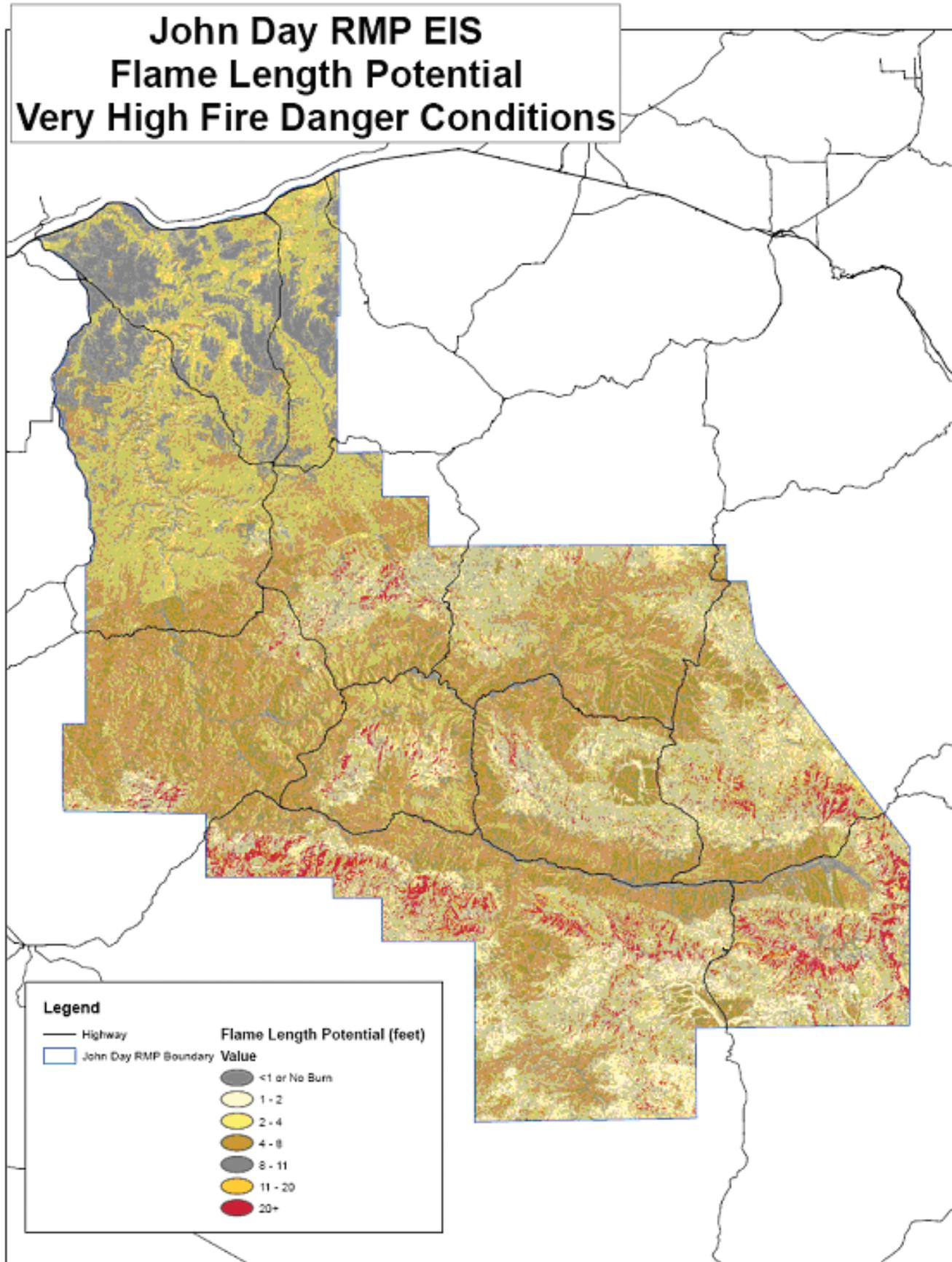
Under Alternatives 2, 3, and 5, prescribed fire fuel treatments, as well as limited mechanical treatments, would be allowed in areas managed for wilderness characteristics. Currently, the need for mechanical treatments has been identified on 7,001 acres of juniper woodlands and forested areas. Within these 7,001 acres, mechanical treatment would significantly decrease the mortality expected in a forested stand if it were to burn under 90th percentile conditions. In the juniper stands, mechanical treatment would allow fire to burn and move the site toward phase I juniper succession (see glossary).

Under Alternative 4, there would be 35,457 acres managed for the protection of wilderness characteristics that would not be available for aggressive fuels treatment. Sites capable of supporting juniper may move toward

**Table 4-9. Relative Fire Hazard on BLM Lands and across All Ownerships in the Plan Area Among Alternatives.**

Category	Flame Length (feet)	Analysis Area Current (all ownerships)	BLM Lands		
			Current	Alternative 1 Year 2037	Alternatives 2-5 Year 2037
1	0 (no burn)	16%	9%	9%	9%
2	0 - 2	16%	9%	11%	13%
3	2 - 4	24%	25%	39%	47%
4	4 - 8	40%	56%	39%	29%
5	8 - 11	<1%	<1%	<1%	<1%
6	11 - 20	1%	1%	1%	<1%
7	20 +	3%	1%	1%	1%

Figure 4-1. FlamMap fire hazard for the John Day Basin plan area.



phase III juniper succession (see glossary). In forested areas, hazardous fuels buildup may increase the risk of stand-replacing and uncharacteristic wildfire. Alternative 1 does not protect any areas found to possess wilderness characteristics. There are 16,015 more acres of lands managed for wilderness characteristics under Alternative 4 than under Alternatives 2, 3, and 5, making it more difficult to return or maintain stands in an FRCC1 condition.

### Lands, Realty, and Land Tenure Effects on Fire and Fuels

The criteria for acquisition and disposal of lands proposed under Alternatives 2–5 would result in larger, more contiguous blocks of BLM land than Alternative 1. This would facilitate a wider range of response to unplanned ignitions under Alternatives 2–5 than Alternative 1.

### Visual Resource Effects on Fire and Fuels

Assignments of Visual Resource Management (VRM) classifications of Class II increase cost and prohibit broad scale juniper treatment relative to VRM Classes III and IV. This results in limited options for mechanical fuels treatments. VRM classifications only vary by alternatives on acquired lands along the North Fork John Day River and in the areas identified for protection of wilderness characteristics. The VRM Class II designation in these areas would reduce the likelihood of fuels treatment on 160,199 acres under Alternatives 2, 3, and 5; on 165,022 acres in Alternative 4; and on 103,645 acres under Alternative 1 (see Table 4-10). Areas in VRM Class I do not differ between alternatives and would not allow for mechanical fuels treatment.

### OHV Use Effects on Fire and Fuels

The use of OHVs can lead to human-caused fires. Under Alternative 1, there are 234,272 acres designated as Open to OHV use. Under Alternatives 2–5, off-road OHV use would be largely concentrated in designated areas (up to 315,020 acres, depending on alternative). Concentrated use would create the potential for more fire starts in areas designated as Open. Where OHV use is Limited to designated roads and trails, the potential for fire starts would be aligned along designated roads and trails. Under Alternatives 2–5, fewer human-caused ignitions may occur outside of designated trail systems relative to Alternative 1. Under all alternatives, enforcement of existing public use restrictions on OHVs is expected to mitigate the risk of human-caused fires.

### Wildlife Effects on Fire and Fuels

Under all alternatives, seasonal restrictions for travel may impact the timeliness of the implementation of fuels projects. Impacts would be negligible because most of the closures take place in the winter when access is difficult due to impassable road conditions. In any case, areas with seasonal closures project planners would need to allow for a longer duration of time to complete fuels projects.

### Access and Travel Management Effects on Fire and Fuels

Under the action alternatives, the closure of some existing roads may delay response efforts. If a road is obliterated or “ripped,” a dozer may be needed to reopen it during a fire incident. Depending on the nature and location of the fire, this may delay response efforts longer than under Alternative 1.

### Cumulative Effects

The Ochoco, Malheur, Umatilla, and Wallowa-Whitman National Forests have increased the acres treated for hazardous fuels reduction and restoration of fire-adapted ecosystems, including prescribed fire and mechanical fuels treatments. This would result in a potential cumulative effect on fire regimes, vegetation and habitat quality and distribution, including possible degraded habitat opportunities in the short term, followed by improved conditions across the landscape in the long term.

**Table 4-10. Size of VRM Class Zones by Alternative (acres).**

Visual Resource Management Class	Alternative 1	Alternatives 2, 3, and 5	Alternative 4
Class I		95,893	
Class II	103,645	160,199	165,022
Class III	174,989	150,994	150,972
Class IV	82,306	49,285	44,484

As mechanical and prescribed fire treatments occur across the landscape, ecosystems would tend to be more resilient to broad scale disturbances from fire, with more opportunities to limit wildland fire growth using treated areas as control lines. These actions would also begin to include fire as part of natural ecosystem processes and result in more natural vegetation and ecosystem dynamics across the landscape.

Prescribed burning would produce smoke, but as ecosystems are restored and fire sizes and intensities decrease there is consequently a potential for a decrease in smoke from wildland fires.

## Aquatic Resources

### Introduction

Analysis of the environmental consequences of the alternatives on aquatic resources considered the following key management actions and related indicators: Fire and Fuels (wildland fire), Aquatic Resources (PACFISH goals, aquatic objectives, PACFISH buffers, and riparian management areas), Wildlife (wildlife road density standards), Livestock Grazing, Recreation Opportunities (OHV use), Access and Travel Management, and Agricultural Land Management.

Indicators used to compare and assess effects on aquatic resources include: source water protection, riparian areas restored from uncharacteristic to native vegetation, instream flows, peak flows, bankfull widths, sediment delivered to stream channels, Proper Functioning Condition (PFC) ratings, residual pool depth, pool frequency, stream function limited by roads, riparian vegetation diversity, large wood, and stream function limited by degraded uplands. These indicators were chosen because they describe water quality and general ecological conditions. These indicators consider limiting factors for fish, water quality, and species identified through the BLM Learning Network (see the Wildlife section of this chapter), and these factors are dependent on stream channels, floodplains, and lentic areas. Key habitat quantity is a limiting factor for all of the John Day River Basin, while sediment loads are a limiting factor in over 80% of the John Day Basin. Habitat diversity, temperature, and stream flow are the other significant limiting factors (BPA 2005).

### Aquatic Resource Indicators

The assumptions and some methodologies underlying these indicators include:

- **Acres of source water protection.** The Source Water Protection Areas (SWPAs) of major municipalities were delineated by ODEQ and the Department of Human Services. The SWPAs include the area that collects and provides domestic water over the course of 20 years. The BLM-managed lands were only present in SWPAs where the source is ground water (as opposed to surface water). Other (small scale) domestic water sources on BLM lands are mostly springs or reservoirs, rarely used for drinking water. Oregon Water Resources Department (OWRD) GIS databases were used to map domestic sources that are not part of a municipality. The acres of source water protected indicate how much each alternative meets legal requirements such as the Safe Drinking Water Act and buffers climatic variations.
- **Acres of riparian areas restored from uncharacteristic vegetation.** Assumptions built into the GIS data used to map vegetation are part of the GIS metadata for this plan. Because of the difference in the mapping scale (large pixels) and relatively narrow shape of riparian areas, the actual amount of uncharacteristic vegetation has a large variance but is assumed to indicate the differences between alternatives. Generally, the uncharacteristic vegetation mapped in riparian areas is assumed to be upland types of vegetation, invasive plants or agricultural fields. Facilities are also found in riparian areas and their footprint occupies space suited for native vegetation. Uncharacteristic vegetation will not result in attainment of the aquatic objective for native riparian vegetation or water quality. Some types of non-native vegetation may achieve objectives for PFC, but may not be considered desired conditions for other values such as fish habitat or water quality limited streams. The acres of riparian areas restored also indicate the resilience of aquatic ecosystems to natural, human, and climatic disturbance.
- **Instream flows measured in cubic feet per second (cfs).** State instream flow goals for the John Day River are assumed to be the flows necessary to support fish and recreation (Lauman 1978). The John Day River and its tributaries yield water from the majority of the plan area. Instream flows are valued for

fish, recreation, and pollution abatement throughout the basin. The energy and sustenance provided by stream flows is the foundation for all aquatic objectives and is the most defining feature of riparian areas. In addition, the amount of water allocated for instream flow indicates the buffer of effects from climate change on aquatic ecosystems. In addition, other uses of water such as restoring riparian vegetation, sustaining local agriculture, avoiding weed invasions, and providing wildlife habitat will also buffer the effects of climate change.

- **Percent increase in peak flows by watershed.** A balance among flow energy, sediment supply, and channel resilience must be maintained for the stream network to remain stable (MacRae 1996). A change in peak flows (stream power) indicates that sediment supply and channel resilience will not be maintained (SCVURPPP 2004). Channels with increased sediment supply and increased peak flows tend to become wider and straighter. If flows are increased, but sediment is no longer available, stream channels tend to become deeper and steeper (incised and removed from their floodplain) (USDI 1998), degrading aquatic habitat. Loss of channel resilience will result in non-attainment of PFC. Altered channel shape and substrate will result in non-attainment of aquatic objectives that are assigned to provide aquatic habitat for fish, native riparian vegetation, instream flows, habitat connectivity, overall channel capability, and water quality to support beneficial uses (John Day Subbasin Assessment 2005). Changes in peak flows also indicate how changes in forest cover from climate change could cumulatively affect aquatic ecosystems. Regression equations (Harris and Hubbard 1983), along with more current precipitation data, were used to model the peak flows resulting from changes in forest cover.
- **Percent increase in stream bankfull width increases by watershed.** The majority of the plan area streams are sediment rich. Sediment discharge to streams increases with increased peak flows. Reductions in vegetative cover and increases in peak flows have been observed to result in wider, flatter stream channels over most of the plan area. A small portion of streams, those dominated by fine sediment, have a tendency to become deeper and steeper when peak flows increase, but this is less common. These relationships have been observed through field assessment of PFC and NEPA (e.g., environmental assessments) documents (e.g., Little Pine Creek and Franks Creek) and calibration from regional regression equations (Castro 1997). Increased bankfull width increases the surface area of water exposed to warm air and increases solar input, thus increasing water temperatures. Water temperature is the most common parameter for non-attainment of water quality standards across the plan area. Elevated water temperature is correlated with other water quality impairments such as low dissolved oxygen and acidic pH. Wide, shallow channels lack pool habitat for fish and would not result in the attainment of aquatic objectives for water quality, channel geometry, surface to groundwater interactions, and fish habitat.
- **Fine sediment delivery to stream channels at stream and road crossings.** Delivery of sediment to stream channels reduces the quality of aquatic habitat (Mebane 1999). While sediment is produced on all roads, delivery to streams becomes a function of the distance between roads and streams. The greater the distance, the larger the filtering capacity of the watershed and the less likely that sediment will reach the stream network. Roadside ditches and culverts that deliver flows to streams reduce the filtering capacity of the watershed (Schiess 2004). In general, sediment from roads within 100 feet of a stream crossing is assumed to reach the stream channel. Analyzing distances greater than 100 feet or projecting different climates did not vary the proportional differences between alternatives. Water Erosion Prediction Project (WEPP) analysis (see Introduction to this chapter) can be used on a site-specific basis to determine the potential for sediment delivery to streams. The values displayed for “sediment delivery to stream channels” throughout this document were modeled using WEPP. The values approximate actual conditions for the plan area. The WEPP model has been used and checked in site-specific environmental analyses (e.g., Little Pine Creek and Franks Creek) within the plan area. These values are used for broader scale analyses of effects between alternatives.
- **Miles of stream near desired residual pool depth.** Pool depth is an indicator of broad scale influences affecting aquatic habitat quality. Decreased water velocities in deep pools increases detritus retention and deposition for use by macroinvertebrates (Lemly 2000). Bisson *et al.* (1982) and Nickleson *et al.* (1992) reported a strong preference for deep pools by salmonid fry and juveniles during both summer and winter. Hayman *et al.* (1996) reported high use of this habitat type by 0-age juvenile salmonids (Mobrand Biometrics 2003). During drought or periods of low flow, habitat is reduced. Deeper pools, such as those formed by large wood, provide more habitats for fish and other organisms during these critical periods. Shallower pools may result in higher mortality from predation or elevated water temperatures (Rosenfeld 2000). Many streams in the plan area have interrupted flow (see glossary), and residual

pool depth is an important indicator and measure of aquatic habitat quality (Cramer and Ackerman, in review 2008), especially in the face of climate change. Residual pool depth information was surveyed using ODFW protocol.

- **Pool frequency.** Pool frequency is assumed to be an indicator of undisturbed, high quality habitat and desired riparian condition. Pools provide thermal refugia (e.g., cooler water in the summer and warmer water in the winter) (Rosenfeld 2000). In undisturbed areas, stream reaches generally have higher pool frequencies (Wood-Smith 1995). In forested regions, large wood aids in pool development. In non-forest systems, riparian vegetation and channel meanders lead to pool formation. Pool frequency information was surveyed using ODFW protocol.
- **Miles of stream at PFC.** PFC is an indicator of the basic stream function required to provide for beneficial uses such as fish habitat, water quality, wildlife, and other values. Riparian-wetland areas that are not at PFC cannot provide the above values on a sustained basis. When a riparian-wetland area is at PFC, this indicates that the current management is allowing recovery toward potential or site capability. Although site potential may change in response to climate and other factors, the physical processes discussed during a PFC assessment are constantly relevant (see Chapter 3, Figures 3-20 and 3-21). Sustaining some values, such as fish habitat or water quality limited streams, may require conditions closer to potential natural community than PFC.
- **Miles of stream reaches with roads limiting stream function.** To differentiate between alternative approaches to address the effects of roads on streams, the existing PFC inventory was used to indicate where roads limit stream functions. This is an indicator that helps measure the attainment of the PFC objective as well as aquatic objectives for channel condition, sediment and water quality.
- **Riparian species composition and diversity.** Willows, alders, sedges, and rushes along streams can effectively dissipate stream energy and provide abundant fish and aquatic habitat. Riparian vegetation is important to the formation and maintenance of pools, side channels, and backwaters. Diverse vegetation provides structural complexity and cover for fish and other aquatic species. Riparian vegetation regulates sediment transport of gravels and organic matter, influencing their effect on other physical and biological processes. As diversity of riparian vegetation increases, so does aquatic habitat (Mobrand Biometrics 2003).
- **Miles of stream needing large wood or instream structure in 30 years.** Large woody debris is an important structural component of riverine ecosystems in the plan area. It has key functions in forming channel types and habitat units, particularly in the creation and maintenance of pools, side channels and backwaters. It provides structural complexity and cover for aquatic organisms. It regulates the transport of sediment, gravel, and organic matter, influencing their effects within physical and biological processes. The ability of large wood to perform these functions depends in part on its abundance, size and type of wood, and size and geomorphology of the stream system (BPA 2005).
- **Miles of stream where upland influences are degrading stream condition.** Changes in upland watershed condition can influence the infiltration, evaporation, and subsurface flow of water on its route to stream channels and wetlands. Plan area PFC assessments indicate where changes in watershed conditions have degraded aquatic conditions.

## Analysis of the Effects of the Alternatives on Aquatic Resources

The analyses described herein are focused on actions of potential measurable environmental consequence. Under all alternatives, the following resource uses would have no effect on aquatic resources or their effects would be eliminated by the use of BMPs: Air Quality, Vegetation—Special Status Plants, Wild Horses, Cave Resources, Special Designations, Wild and Scenic River Designation, Native American Uses, Paleontological Resources, Minerals, and Lands and Realty (including Renewable Energy).

### Soil Management Effects on Aquatic Resources

Management direction of Alternative 1 to maintain soil productivity and minimize erosion does not specify limits for soil disturbance other than to minimize it and apply BMPs. Thus, it is not possible to quantify effects of Alternative 1 on aquatic resources. Alternative 2 is much more specific in terms of measurable actions and objectives.

This standard under the action alternatives would likely decrease sediment input to stream channels at road crossings and decrease the miles of stream where roads or upland watershed conditions are degrading

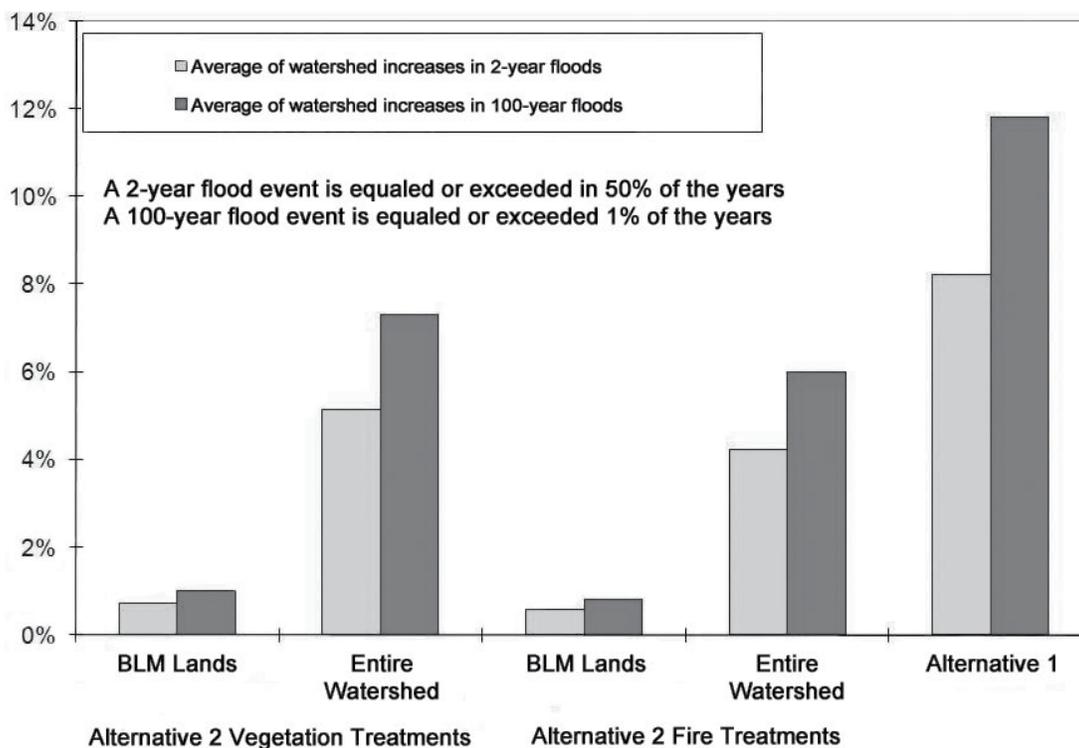
stream channels. Under Alternatives 2–5, facilities with excess erosion potential are removed or rehabilitated. Implementation and effectiveness monitoring of BMPs minimizes the risk, but does not eliminate the potential for sediment input to streams (Rashin 2006). Therefore, under Alternative 1, the risk of sediment delivery to streams would increase over the life of the plan. Under Alternatives 2–5, the risk of sediment delivery would remain constant over the life of the plan.

### Vegetation Treatment Effects on Aquatic Resources

Vegetation treatment under Alternative 1 is more likely to remove a larger proportion of forested watershed cover than Alternatives 2–5. Alternative 1 is focused on commercial timber production, limited treatment, and wildfire response. These factors would likely result in broad-scale removal of forest watershed cover through uncharacteristic wildfire or timber harvest. Alternatives 2–5 accelerate vegetation treatment but remove less forested watershed cover over time because treatment areas would be smaller. A reduced risk of fire as a function of vegetation management under the action alternatives would lead to less catastrophic loss of cover from across the landscape compared to Alternative 1. Fuels and vegetation treatments to achieve ARV under Alternatives 2–5 would maintain large overstory trees, and prescribed fire and vegetative treatments would mimic natural disturbances. Alternatives 2–5 recognize that all seral stages are integral to watershed function. Vegetation management under Alternatives 2–5 would move 58 miles of stream toward PFC by restoring upland watershed conditions that currently contribute to non-attainment of standards.

Peak flows were modeled for 5th field watersheds (up to 250,000 acres) in the plan area. Increases in peak flows at various return intervals are displayed in Figure 4-2. Alternative 1 increases peak flows more than Alternative 2 because more large fires remove forest cover. Variations in peak flow could be exacerbated under all alternatives, but most greatly by larger wildfires in Alternative 1. However, peak flow increases are generally short lived because of restoration of watershed cover within approximately 10 years (Lewis 2001). This quick recovery limits the amount of time watersheds are at risk to increased peak flows from major precipitation events. Recovery time may be altered by climate change.

**Figure 4-2. Components of increases in peak flows as a result of vegetation and fire treatments for 2-year and 100-year floods between alternatives.**



Although removing forest cover has been observed to increase peak flows, it is important to note that none of the alternatives increased peak flows beyond the variance of the peak flow model (Hubbard and Harris 1978, Grant *et al.*, in press). Channel width would increase half as much as peak flows increase.

Alternative 1 includes general standards for vegetation treatment. Some prescriptions for improving watershed cover are included in existing RMPs. Under the action alternatives, vegetation treatment standards are tied to aquatic objectives. As a result, they better complement aquatic objectives. Implementation of the standards and BMPs would benefit riparian conditions.

Broad species diversity of native riparian plants would be a consequence of Alternatives 2–5. Implementation of the action alternatives would enhance 113 miles of stream that would not be affected under Alternative 1.

Vegetation management under Alternatives 2–5 is more likely to increase the amount of older aged forests than Alternative 1. Model results illustrate that fish overwintering in streams among older-aged dry forests have significantly higher survivals than those over-wintering in young forests (Paulsen and Fisher 2001). Therefore, upland vegetation management under Alternatives 2–5 is more likely to improve overwinter fish survival than Alternative 1.

### **Fire and Fuels Effects on Aquatic Resources**

In general, Alternatives 2–5, through the Aquatic Conservation Strategy (ACS), provide more geographically specific management and active restoration than Alternative 1. The ACS includes the six key aquatic components of the ICBEMP Strategy for incorporating ICBEMP science into RMP revisions: riparian conservation areas, strong hold areas, multi-scale analysis, restoration priorities, management direction, and monitoring. The ACS makes steelhead population strongholds a priority for restoration. This would provide high quality habitat for species, and support expansion and restoration of steelhead to adjacent watersheds. The ACS identifies Riparian Management Areas (RMAs) and allows for adjustment to RMAs to reflect site conditions recognizing watershed wide riparian conditions and trends (Quigley and Arbelbide 1997, Megahan and Hornbeck 2000, Spence *et al.* 1996, USDA Forest Service 1997). The ACS uses multi-scale analysis to evaluate existing conditions, factors limiting aquatic species populations, resource risks, management needs, and restoration opportunities. Management direction, desired conditions, objectives, and management actions provided in the ACS would result in actions consistent with, and contributing to achieving those desired outcomes and conditions.

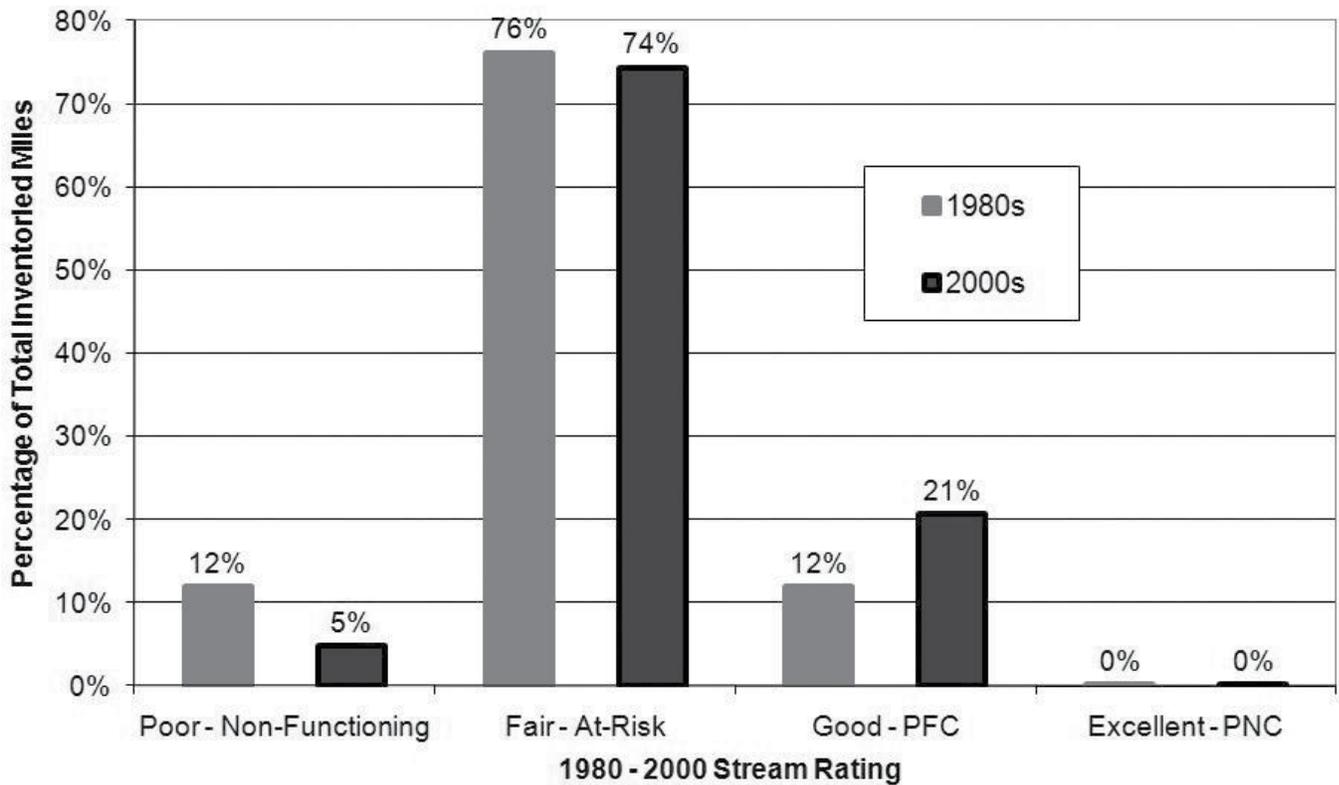
The PACFISH (part of Alternative 1) does not propose any ground-disturbing actions or restoration, but sets in place certain riparian management goals and management direction with the intent of arresting degradation and initiating passive restoration of riparian and stream habitats. PACFISH set interim priority watersheds for restoration, but no further information was provided concerning the scope, type or timing of watershed restoration (NMFS 1995 a). In contrast, Alternatives 2–5 identify restoration actions required to attain aquatic objectives. Full implementation of the restoration actions and other components of the ACS would result in attainment of a broader scope of aquatic objectives than Alternative 1. Differences in current and projected stream channel conditions relative to proper functioning conditions (from the 1980s to the 2000s) among Alternative 1 and Alternatives 2–5 are contrasted in Figure 4-3.

Alternative 1 has resulted in largely fair ratings for stream channel conditions. Alternative 1 improved condition ratings on 20% of streams, whereas Alternative 2 is designed to improve condition ratings on 35% of the streams through active restoration. This assumes full implementation of restoration and BMPs under Alternatives 2–5 over the life of the plan. These assumptions are based on an increase in restoration, updated science, and geographic specificity under Alternatives 2–5 and on findings that suggest increasing large wood leads to increases in pool frequency approximately 50% over other passive treatments. The assumption is that certain stream channel types, particularly step-pool and high sediment yielding systems, would be more effectively restored by active rather than passive restoration. This assumption is based on monitoring and modeling of adjacent and similar landscapes (Wondzell 2007, Hilderbrand 1998, Montgomery 1995).

### **Riparian Desired Conditions**

Proper Functioning Condition (PFC) is not included in Alternative 1 as a method to compare current to proper functioning ecological condition, except in the context of grazing under the PACFISH amendment. Alternatives

**Figure 4-3. Change in stream channel condition for streams inventoried in 1980 and 2000 and projected to 2020 for the action alternatives only.**



2–5 specifically incorporate national guidance on PFC into the RMP. Under Alternatives 2–5, the foundational objective for attaining PFC would be to provide the greatest diversity of vegetation and habitat for wildlife, fish, livestock and watershed protection (BLM Riparian-Wetland Initiative 1992). The use of PFC as a management objective is dependent on the following key items included in the aquatic strategy under Alternatives 2–5:

- The required number, type, and experience level of personnel conducting PFC assessments to ensure quality and validity of the assessment.
- PFC does not replace quantitative monitoring.
- Use of all aquatic objectives as the basis for making grazing or other management changes.
- Incorporation of other measures and tools for assessing the implementation, effectiveness, and validity of aquatic objectives, including biologic components.
- PFC is a short-term plan objective that enables long-term attainment of desired conditions.

Under Alternative 1, the objective for riparian vegetation management is to achieve mid- to late seral conditions (“Excellent - PNC” in Figure 4-3) along 60% of streams. Alternatives 2-5 aim to achieve this objective on 5% of streams. The action alternatives would provide more measurable and attainable objectives for the plan area than would Alternative 1. Although 95% of riparian areas would not develop to mid- to late seral conditions under Alternatives 2–5, riparian areas would achieve an appropriate distribution of successional stages, and would be at PFC or on an upward trend, regardless of their seral stage. While both alternatives utilize BMPs, Alternatives 2–5 incorporate geomorphic information about streams, through PFC and specific objectives, into the design of site-specific BMPS (Agouridis *et al.* 2005). This incorporation is more effective at restoring water quality at individual sites. Managing a larger portion of the landscape toward PFC over the life of the plan and moving toward attainment of the 10 aquatic objectives would result in improved watershed condition across a larger portion of aquatic habitat. The 60% potential standard under Alternative 1 would continue to be difficult to define, measure, and realistically achieve. Alternatives 2–5 would better facilitate measurable and achievable restoration of aquatic conditions.

## **Riparian Management Objectives**

Alternative 1 (PACFISH) contained set numbers for Riparian Management Objectives (RMOs) while Alternatives 2–5 serve to draw conclusions at the landscape scale. Alternative 1 does not specifically prohibit degradation of conditions in RMAs where management objectives are being attained. PACFISH does not provide specific direction to achieve RMOs (NMFS 1995b). In contrast, Alternatives 2–5 focus on the restoration of processes, such as sediment transport, or use types, such as fish species. Alternatives 2–5 would allow aquatic conditions to progress to their full capability; whereas in Alternative 1 aquatic conditions might not improve beyond the RMO numeric standards.

## **Standards and Guides versus BMPs**

The PACFISH guidance under Alternative 1 applies to a specific set of management activities (timber, roads, grazing, minerals, fire and fuels management, lands and realty, riparian areas, watershed and habitat restoration, fish, and wildlife). Specific guidelines for uses such as OHV, juniper removal, oil and gas, or any subsequent new uses are absent in Alternative 1. However, any action in RHCAs must move condition toward attainment of RMOs. Alternatives 2–5 use Interdisciplinary Teams (IDTs) and BMPs to address new uses. Alternative 1 does not include direction for modification or improvement of BMPs and standards.

Under Alternative 1, the eight goals of PACFISH were stringently applied to watersheds with anadromous salmonids and the remainder of the area managed with a lower priority, but for the same intent. Under Alternatives 2–5, the aquatic objectives applied across the landscape together would increase the resiliency of aquatic ecosystems. Action alternative objectives for riparian function, habitat connectivity, locally important fish species, water use, and clean public drinking water may be attained on BLM land over the life of the plan. Other objectives are dependent on the actions of other land managers and/or require longer time frames (over 100 years) to achieve objectives. The ACS objectives, actions, guidelines, and BMPs in Alternatives 2–5 address requirements for all organisms identified through the BLM Learning Network (see Wildlife section) that use riparian habitat in the plan area.

## **Measurable Indicators of Progress (Measures of Attainment)**

Alternative 1 is guided by PACFISH goals that lack measures to track attaining them. In contrast, Alternatives 2–5 are guided by aquatic objectives that have “measures of attainment” to track progress in achieving management objectives through the life of the plan. Alternatives 2–5 provide guidance for managing water quality limited streams to achieve beneficial uses and meet state water quality standards and to protect public drinking water supplies, whereas Alternative 1 does not. Alternative 1 emphasizes restricting uses to avoid impacts on anadromous fish and water quality. Alternatives 2–5 update the restriction on uses by applying BMPs with new science and uses multiple scale analysis to tailor the BMPs to this particular plan area. Alternatives 2–5 prescribe actions to be taken to restore RMAs within the plan area, while Alternative 1 focuses on modifying uses to avoid negatively affecting aquatic resources.

## **Water Quality and Beneficial Uses**

Under Alternatives 2–5, the objective for water quality that provides for beneficial uses, the sum of the actions, and BMPs would result in attainment of water quality standards where BLM is the major landowner. Where BLM is not the major landowner, BLM would not exceed the maximum daily load allocation, and may help facilitate attainment of this objective through cooperative efforts in the watershed. The amount of acres in uncharacteristic vegetation would be less in Alternatives 2–5 than Alternative 1. Under existing RMP direction (Alternative 1), 60% of streams are managed to “potential” and vegetation is not addressed on 303(d) listed streams. In Alternatives 2–5, 100% of streams have their vegetation managed to capability within natural disturbance regimes. Based on the biophysical settings (see Appendices E and F), 3,100 acres of uncharacteristic riparian vegetation may be restored to characteristic vegetation under these alternatives.

Under Alternatives 2–5, actions and BMPs for water quality and beneficial use would result in stream channels in or moving toward PFC and potential natural conditions (Figure 4-3). Active and passive restoration of head cuts would restore vertical stability on 22 miles of stream channel.

### **Stream Channel Integrity**

Linear features (e.g., roads and trails) can limit physical function of stream channels. Alternative 1 emphasizes road closures for roads contributing to nonattainment of RMOs by prioritizing roads for closure, stabilization, or obliteration. Alternative 1 would protect stream channels from the construction of new roads that could affect stream function, but only about five miles of streams have had related roads decommissioned to restore stream function to date. Alternatives 2–5 identify criteria, a decision tree, and actions to manage roads. Based on existing PFC information, 40 stream miles have limited physical function because of roads that limit the ability of stream channels to route sediment and convey stream flow. Alternatives 2–5 include the linear feature decision tree. Application of the decision tree, if applied with today's information only, would result in closure, re-routing, decommissioning, obliteration, or rehabilitation of 56 miles of roads and better facilitates. In addition, those 40 stream miles would move toward PFC. Rerouting roads away from stream channels would reduce annual average sediment delivery by 50 tons. Assuming that PFC assessments are updated and expanded, more miles of stream may be restored by using the decision tree of the action alternatives over the life of the plan.

Under Alternative 1, roads that may affect watersheds are improved to avoid effects to stream function. Five roads maintained by the BLM are affected. Under Alternatives 2–5, BMPs are expanded to include all linear feature construction and design in a more comprehensive manner. Implementation of these BMPs would further reduce the risk to streams from attaining PFC as a result of roads and trails. For example, ditches 50 feet before a stream crossing would reduce potential sediment delivery to streams by 50% (reduced from 430 to 206 average annual tons of sediment). Alternative 1 does not specifically address restoration of head cuts. In Alternatives 2–5, restoration of head cuts would restore vertical stability to 22 miles of stream.

### **Surface to Groundwater Interactions**

Management under Alternative 1 focuses on restoration of in-channel habitat for anadromous fish but does not consider the risks and interdependencies of channel structures on channel function. Alternatives 2–5 emphasize less intrusive restoration techniques for restoring stream channel and floodplain connectivity. The techniques complement other ACS objectives and present lower risks to channel function than Alternative 1. The actions under the action alternatives are designed specifically for plan area streams and ecosystems. Alternatives 2–5 incorporate elements beyond the general guidance provided in PACFISH and existing RMPs. Therefore, Alternatives 2–5 would be more effective at restoration than Alternative 1.

### **Water Rights**

Management under Alternative 1 provides guidance for water rights on the areas covered by the John Day Wild and Scenic River Plan and the Sutton Mountain CRMP. Alternatives 2–5 extend that same direction across the remainder of the plan area and provide more specific direction for the types of beneficial uses of water and water rights (see Table 4-11). The amount of water withdrawn from any individual source is protected from affecting instream flow goals by the table of water use stipulations included in Alternatives 2–5. Alternative 1 only contains flow stipulations for the Sutton Mountain and Wild and Scenic River Plan areas.

### **Lentic Areas**

Management of lentic areas under Alternative 1 was not specified in current RMP direction and was fairly generic in PACFISH. Alternatives 2–5 provide more specific measures for achieving desired riparian condition. Alternatives 2–5 introduce reservoir safety and construction BMPs. These would reduce risks of dramatically increased peak flows and delivery of sediment to stream channels from failed reservoirs. Overall, the plan area

**Table 4-11. Comparison of Water Right Uses Between Alternatives.**

Water Right Use	Cubic Feet per Second (CFS)	
	Alternative 1	Alternatives 2–5
Irrigation and Wildlife	5	0-10
Instream Leases	11.5	12-17
Mining	12	0
No Management	5.5	0
Ag Land Disposed	2	3

has very few lentic areas, but springs and seeps are common. Management actions prescribed under the lentic objective of the action alternatives is more likely to move wetland vegetation and aquatic conditions toward attainment of desired conditions than Alternative 1.

### ***Native Riparian Plant Communities***

Under Alternative 1, current RMP guidance and PACFISH management of riparian vegetation focuses on riparian habitat condition for anadromous fish species and general ecological diversity and productivity. Alternative 1 relies on passive restoration of channel conditions. Alternatives 2–5 emphasize the use of native riparian plant species unless ACS objectives cannot be attained without the use of nonnative species. The actions identified in Alternatives 2–5 would move stream channels toward potential natural vegetation by incorporating natural disturbance regimes and implementing active restoration. The appropriate composition of vegetation would be restored to approximately 70 miles of stream currently lacking potential natural vegetation. Alternatives 2–5 require woody riparian species to achieve unarrested and/or released growth forms (see glossary) and restore their potential stature. This would move almost 100 miles of stream that currently lack sufficient age class distribution towards attainment of PFC. In addition, restoring and maintaining riparian areas would provide important corridors for aquatic species as they adapt to climate change.

### ***Vegetation for Physical Stream Function***

Restoration actions for large wood are not prescribed in Alternative 1. Alternatives 2–5 prescribe use of invading conifers and other sources of large wood to restore pool habitat. This would shift attainment of pool desired conditions for restoration work from approximately 75 to 90%.

Under PACFISH, Alternative 1 contains PFC as a standard for grazing uses, but does not apply the standard to other uses in the landscape. Alternative 1 also does not include provisions for physical function ratings.

Alternatives 2–5 prescribe changes in management to ensure the condition of riparian vegetation would dissipate energy and build stream channel habitat. Alternatives 2–5 include specific restoration actions, such as restoring alder and cottonwood to restore physical function of riparian vegetation. Alternative 1, under PACFISH, was not designed to, and does not include this specificity. Alternatives 2–5 would result in 50% of the plan area streams attaining PFC and providing physical stream function. Complete attainment of objectives over the life of the plan may not occur under any alternative due to the time and disturbances required to grow the large plants to meet this objective.

### ***Fish Habitat***

Alternatives 2–5 contain actions for restoring watershed cover for fish habitat, while Alternative 1 includes fish habitat restoration focused on construction of weirs, deflectors, and other artificial instream structures. These types of structures may not be appropriate for many miles of stream in the plan area. Alternatives 2–5 emphasize using passive restoration and halting the source of degradation before using active restoration. Under Alternatives 2–5, restoration actions should improve timing, intensity, and duration of peak flows and improve late season flows to attain instream flow objectives. Active restoration work would be designed in concert with the entire landscape. Alternatives 2–5 also contain numeric criteria for spawning habitat that was not included in Alternative 1. Criteria for spawning habitat improvement would ensure attainment of healthy fish habitat and would provide a measure for stream channel sediment delivery.

### ***Riparian-Dependent Biotic Communities***

Alternative 1 minimizes impacts to riparian areas and water quality. Alternatives 2–5 protect riparian areas and add a proactive aquatic and riparian restoration component. Alternatives 2–5 include provisions for addition of wood to streams contributing to a 50% increase in pool habitat where large wood is lacking. Alternatives 2–5 restore stream channel crossings, in combination with the crossings of other landowners, such that 90% of stream routes in each 5th field watershed have crossings that accommodate the 100-year floods, and route sediment and large wood in accordance with the natural geometry, slope, and bed stability of the channel. Achieving these objectives is dependent on other landowners, with BLM contributing to restored conditions on approximately 10% of streams. Passage requirements under Alternative 1 are proposed solely for passage of anadromous fish. Alternatives 2–5 use natural stream bed stimulation, which would provide passage for all aquatic species.

### **Safe Drinking Water**

Alternative 1 does not include management direction for protection of domestic water sources. Alternatives 2–5 afford protection to 6,700 acres of public Source Water Protection Areas and 200 acres of other domestic water sites on BLM.

### **Riparian Management**

Riparian Management Areas include a larger area and more affected resources under Alternatives 2–5 than Alternative 1. Alternative 1 (both existing RMPs and PACFISH) manage for the primary use of anadromous fish and meeting Clean Water Act requirements. Alternately, Alternatives 2-5 address fish and water quality, but also promote safe drinking water, judicious use of water rights, protection of physical function for all riparian-dependent species, and floodplain restoration. Under Alternative 1, areas reserved for riparian management vary from 25 to 300 feet on either side of stream channels and lentic areas. The extent of the riparian management areas under Alternative 1 would range from 25 to 300 feet slope distance or the 100-year floodplain, whichever is greater.

There is considerable variation in the literature regarding the width of riparian area necessary to maintain water quality and aquatic habitat condition (FEMAT 1993). A study of riparian management area widths reveals that resource requirements of channel complexity, nutrient, sediment and temperature buffering, general ecosystem function, anadromous fish, mammal, bird, reptile amphibian and bird habitat vary across the landscape (Santa Clara County 2000). Variable widths of Alternative 1 afford variable resource protection. Based on a set of 57 studies, Alternative 1 affords resource protection that decreases from 80 to 0% as widths decrease. Conversely, the majority of objectives for riparian areas in the action alternatives are met within the ACS width of 300 feet (plus the width of the 100-year floodplain) of perennial and intermittent stream channels (Figure 4-4) (County of Santa Clara Planning Office, 2003). Widths of the flood-prone area plus 300 feet under Alternatives 2–5 would be sufficient to address factors of soil stability, water quality, microclimate, litter fall, root strength, shade, and large wood (pers. comm. Scott Hoefer NMFS 2008). All alternatives have sufficient RMAs to protect salmonid habitat in forested watersheds (Pollock and Kennard 1998).

The alternatives differ in the criteria used to delineate RHCAs (or RMAs). Alternative 1 RHCA widths vary depending on the presence of fish and whether flow is intermittent or perennial. Alternative 1 protects key watersheds, which are those with salmonid habitat, and has smaller widths along intermittent streams than perennial streams compared to the action alternatives. As a result, Alternative 1 management actions along intermittent streams could affect stream temperature and recruitment of large wood, increase sediment generation and reduce sedimentation of stream (NMFS 1995a). In contrast, Alternatives 2–5 extend the protection to all watersheds in the plan area, regardless of the presence or absence of fish. Alternatives 2–5 do not differentiate between streams of varying flow regimes or fish presence when delineating RMAs and provides sufficient protection for all flow regimes and fish (NMFS 2008). RMA widths address multiple resource concerns and protect multiple species (see Appendix Q and Figure 4-4).

Alternative 1 does not include a clear decision framework for mitigating effects originating outside RHCAs. Alternatives 2–5 set 20 acres as a trigger for using riparian management objectives as criteria for evaluating effects originating outside RMAs.

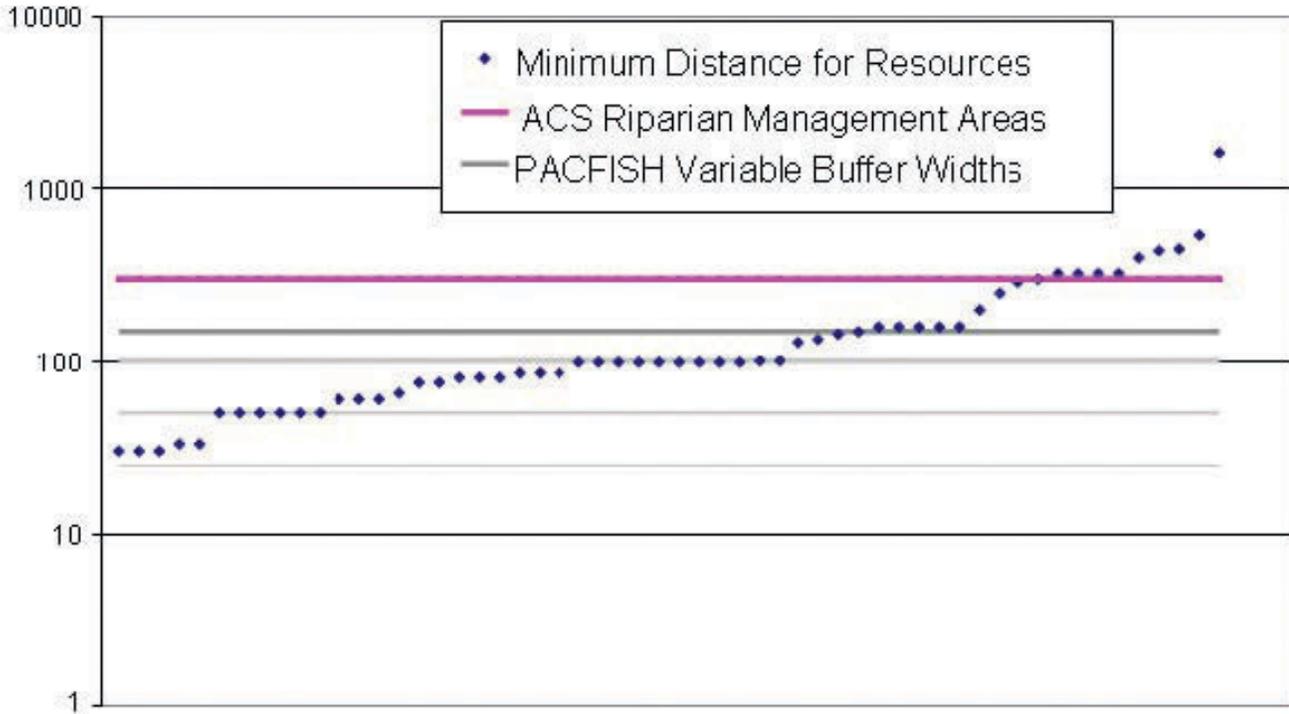
Alternative 1 limits management within RHCAs whereas Alternatives 2–5 emphasize attainment of aquatic objectives and restoration. This shift in management focus is enabled by the use of existing subbasin assessments under Alternatives 2–5. Vegetation treatments, roads, and trails within the 300-foot RMAs are proposed throughout the life of the plan. The use of ID Teams and BMPs would allow these uses to attain resource objectives.

### **Transportation and OHV Effects on Aquatic Resources**

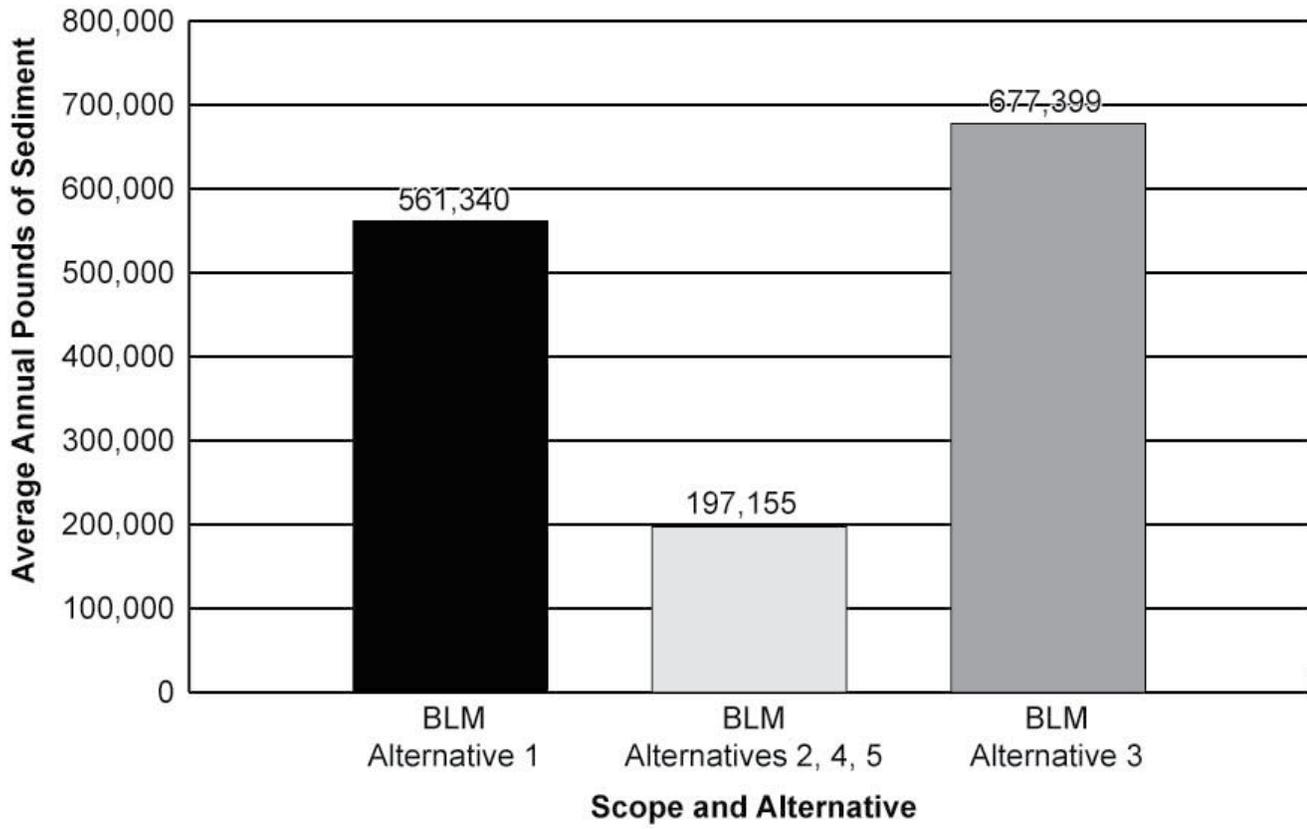
The plan area contains streams currently listed as water quality limited under the Clean Water Act 303(d) due to sediment. The action alternatives would contribute to the restoration of water quality in these streams.

For comparing alternatives, sediment from roads and trails within 100 feet of a stream crossing is assumed to reach the stream channel. Although BMPs are assumed to reduce sediment delivery to stream channels, stream crossings increase the risk of effects on aquatic species. The differences in sediment delivery from stream crossings between alternatives are compared in Figure 4-5. Compared to Alternative 1, Alternatives 2, 4, and 5

**Figure 4-4. Riparian widths compared to results of 57 studies on minimum widths (distance) required to meet resource requirements of channel complexity; nutrient/sediment/temperature buffering; general ecosystem function; and anadromous fish, mammal, bird, reptile, amphibian, and bird habitat (feet from stream channel).**



**Figure 4-5. Sediment delivery from road crossings to stream channels by alternative. (Wepp Model)**



would reduce sediment delivery to streams as a function of road closures. Alternative 3 would result in increased sediment delivery to streams because it would open many stream crossings that are closed under Alternatives 1, 2, 4, and 5.

Open OHV designations in riparian areas allow indiscriminate crushing of riparian vegetation, churn up stream channel habitat, initiate erosion, and remove ground cover (Ouren *et al.* 2007). These effects reduce physical stream function and contribute to non-attainment of PFC. Alternative 1 has 50% of riparian management areas with Open OHV designations. Under the action alternatives, less than 1% of riparian management areas have Open OHV designations (see Table 4-12). The action alternatives would result in more riparian management areas moving to proper functioning condition than Alternative 1.

Under Limited OHV designations, designated trails are likely to cross through riparian management areas. Similar to road crossings at streams, OHV crossings can cause sediment delivery to stream channels. However, very few new stream crossings are anticipated, and the use of BMPs and guidance under aquatic objectives would avoid degradation of physical stream function. Alternative 1 has 36% of riparian management areas with Limited OHV designations. Under the action alternatives, large portions of previously Open areas are converted to Limited OHV designations. The designated trail and stream crossings in the action alternatives would result in more riparian management areas at proper functioning condition or potential than Alternative 1.

The Closed OHV designation ensures no sediment delivery or disturbance of aquatic habitat would occur. The action alternatives include approximately 15% (it ranges from 14 to 19) more Closed areas than Alternative 1 and would reduce the risk of sediment delivery to stream channels and disturbance of aquatic habitat.

Under Alternatives 1, 2, and 3, there is an Open designation on Rudio Mountain. This designation may reduce watershed cover, but the Open areas are small, primarily flat, and some already lack watershed cover. Therefore, it is unlikely that continuing the Open OHV use designation in these areas would translate into measurable differences of peak flows or sediment delivery to stream channels between alternatives. Under the action alternatives, triggers would ensure that the Open OHV designation does not violate water quality standards and ESA guidance.

Little Canyon Mountain is allocated for OHV use in Alternatives 1–4. Anticipated erosion and sediment delivery from OHV use would be isolated, and incremental increases in erosion would be drowned out by the erosion from areas already dramatically disturbed by historic mining and vehicle use. For Little Canyon Mountain and Rudio Mountain, sediment delivery would not be measurably different between the alternatives. All the alternatives would be consistent with direction in Executive Orders 11644 (Use of Off-Road Vehicles on Public Lands, February 8, 1972), 11989 (Off-Road Vehicles on Public Lands, May 24, 1977), and CFR 8342.1. Although Alternative 5 closes Little Canyon Mountain to OHV use, there are not measurably different effects between Alternatives 2–5. All action alternatives minimize effects to soil, watersheds, vegetation, and fish.

Prior to cleanup and active management of the Little Canyon Mountain area a few years ago, the area was used as a dump site for vehicles, refrigerators, appliances, and other rubbish. All alternatives propose continuing active management and the OHV use (mostly from the surrounding communities). Cleanup and active management of the Little Canyon Mountain area would reduce the risk of toxic materials from rubbish being dumped at the site and leaching into groundwater.

Under Alternatives 2-5, OHV use would not retard the attainment of Aquatic Objectives over the life of the plan. New proposed OHV uses, such as specific trails, would be designed to meet aquatic objectives. If necessary, site-specific use of BMPs and guidelines for OHV use would address site-specific risks to water quality and fish

**Table 4-12. Acres of OHV Designations within Riparian Management Areas by Alternative.**

OHV Designation	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Open	61,260	342	294	2	0
Limited	44,401	86,9486	87,579	82,399	88,168
Closed	19,088	37,460	36,577	42,348	36,581

habitat such as excess sediment delivery to the stream channel and water temperature increases from changes in shade and channel geometry.

Due to a combination of factors (OHV closures proposed by the Forest Service for adjacent lands in the plan area, closures on private lands, and BLM closures in the action alternatives), cross-country OHV users may concentrate their use in Little Canyon Mountain and similar areas. Providing areas for concentrated use (2 acres) may improve compliance with OHV closures and designated trail systems across the entire plan area. This would maintain or improve watershed condition across the rest of the public lands in the plan area (2.2 million acres).

### **Wildlife Management Effects on Aquatic Resources**

Alternative 1 does not include road density standards for the plan area. The lack of road density standards may increase road and stream crossings. These increased crossings increase the risk of excess sediment delivery to stream channels.

Under the action alternatives, road densities are prescribed to protect wildlife values. The prescribed road densities of less than 2 miles per square mile are slightly less than some of the existing road densities. By potentially decreasing the number of road crossings, the prescribed road densities would decrease the risk of sediment delivery to the stream channel (see Figure 4-5).

Construction of wildlife habitat features, such as water developments occur under all alternatives and may temporarily disturb riparian areas and springs. Alterations of vegetation for wildlife habitat, such as mowing, burning, tree cutting, and planting may alter the proportion of watersheds with forest cover. These alterations would be within the prescriptions provided in the Vegetation section. These effects are displayed by alternative under "Vegetation Treatment Effects on Aquatic Resources."

### **Wilderness and Wilderness Characteristic Effects on Aquatic Resources**

Modeling of land uses shows that fish overwintering in areas managed as older dry forests have significantly higher survival rates than those overwintering in young, dry forest stands (Paulsen and Fisher 2001). Because commercial harvest would not be allowed in areas managed to protect wilderness characteristics, it is assumed that forests will be managed as older forests except for stand-replacing events. Alternative 1 has the fewest acres managed for WSA and wilderness characteristics. Alternatives 2, 3, and 5 identify acreage for the protection of wilderness characteristics. Alternative 4 has the most protection of WSA, Wilderness, and wilderness characteristics (see Table 2-23 for acreage values). Hence, the action alternatives, specifically Alternative 4 which has the most acreage for protection of wilderness characteristics, would have greater likelihood of providing quality overwintering fish habitat than Alternative 1.

### **Livestock Grazing Management Effects on Aquatic Resources**

The alternatives would not differ in their grazing management effects on aquatic resources because the standards for protection of aquatic resources are the same across all alternatives. Alternative 1 relies on PACFISH Enclosure B's programmatic guidelines for livestock grazing, which is similar to the aquatic management prescribed under Alternatives 2-5 (see Table 2-4 "Management of Riparian Areas by Function Rating"). Additional direction to manage grazing to protect fish habitat is also found in existing RMPs. Under Alternative 2, the grazing decision tree was designed to reduce potential conflicts associated with public interests and BLM multiple-use resource management objectives (Kauffman *et al.* 2004).

All the grazing alternatives include the requirement to attain "near natural recovery" of aquatic habitat. Even well managed grazing includes the risk that livestock may take a bite of a willow tree, spook a fish, step in a stream channel, create a hoof print along a stream bank, deliver fecal matter to a stream, and inflict similar actions. The risk of these activities occurring increases proportional to the BLM miles of stream in allotments open for grazing. Alternative 1 has the most acres of riparian management areas open to grazing. Alternative 2 reduces the area by 35% and Alternatives 3-5 reduce the acres of riparian management areas open to grazing by 50%. However, none of the alternatives cross thresholds for aquatic system health under existing policy, or state or federal law. Further, all of the alternatives would restore the aquatic systems and attain aquatic objectives across the entire landscape.

## Recreation Management Effects on Aquatic Resources

Outside the OHV designations, recreation management is not anticipated to significantly affect aquatic resources. Alternatives 2–5 propose up to three new recreation sites for a total increase of 34 acres within RMAs compared to Alternative 1. The use of BMPs is expected to minimize sediment delivery from the disturbances associated with high recreation use along stream channels and floodplains. However, the development of these recreation sites is assumed to help reduce pressure from dispersed, unmanaged recreation that could potentially increase sediment delivery to stream channels. Alternatives 2–5 may present opportunities to reduce soil disturbance on stream crossings from roads and reduce sediment delivery to stream channels, particularly in the North Fork John Day subbasin.

## Minerals Development Effects on Aquatic Resources

Protection of aquatic resources from minerals development would generally be greater in the action alternatives than in Alternative 1. Alternative 1 allows mining activity in RMAs as long as reclamation bonds and plans are prepared. Some mines with harmful effects to aquatic resources may proceed under Alternative 1 through to consultation for ESA compliance (NMFS 1995 a). Under Alternatives 2–5, all streams, except Dixie, Standard, and Canyon creeks would be identified as avoidance areas for mineral entry and are protected from any effects from new mineral uses (Table 2-14). Existing and new sites with mineral operations are required to meet ACS objectives through stipulations identified by an IDT. These sideboards eliminate impacts to aquatic resources under Alternatives 2–5. The limited recreational gold mining anticipated on Dixie, Standard, and Canyon creeks has sufficient side boards in place to avoid effects to aquatic resources. Additionally, there would be limitations of size, scope, and type of equipment to protect aquatic resources. In any case, the gold production potential of these sites is limited.

## Effects of Current and Reasonably Foreseeable Future Management

Future management on BLM, Forest Service, State, private, and other land within the plan area is assumed to be similar to current management. The Forest Service Schedule of Proposed Actions (SOPA) is indicative of the types of management actions that are likely to continue into the future throughout the plan area (see Cumulative Effects section for vegetation).

## Cumulative Effects

### **Vegetation, Fire and Fuel Management**

Planning area land managers generally share the objective of reducing ladder fuels to help reduce the potential for crown fires. This includes thinning and using prescribed fire to reduce potential for stand-replacing fires. Forest managers will conduct small tree thinning, underburning, hand piling and lopping of slash to reduce fuels, removal of hazard trees, and recovering the value of dead and dying timber damaged by wildfires. Thinning of overstocked stands of ponderosa pine and Douglas-fir is proposed to improve stand health and vigor. Many thinnings would be done from the understory, with the largest and most vigorous trees left after thinning.

Commercial thinning of dry site forest and woodlands would be conducted to reduce tree competition and improve stand health and vigor. These project areas are likely to include noncommercial thinning of young conifer stands to reduce tree density in the understory. Removal of post and pole size lodge pole through personal use post and pole removal are likely to occur on several hundred acres in the plan area.

The amount of forest health treatments on non-BLM lands is largely dependent on global fluctuations of social, economic and environmental demands. Forest health treatments would be required on private lands in order to completely attain desired conditions for pools. While state forestry practices are designed to provide large wood and aquatic habitat, research has shown that these rules will only attain about 50% of the potential large wood recruitment or about 25% of desired pool frequency conditions (Cordova 1995). Increases in the use of categorical exclusions for vegetation treatment may increase the acres of federal lands treated.

Land managers across the plan area will continue site-specific treatment of invasive plant species on thousands of invasive plant sites. Treatment methods include herbicides and manual, mechanical and cultural treatments. The National Programmatic EIS for Vegetation Management (USDI 1991a) addresses the cumulative effects of these sorts of activities.

Agencies with wildfire response responsibilities will continue fire suppression by aerial application of fire retardant to fight fires in the plan area. Water quality effects of fire retardant will be isolated and minimized by the requirement for compliance with the Clean Water, Endangered Species and Safe Drinking Water Acts, and wildfire retardant avoidance areas.

Vegetation management by other jurisdictions across the plan area is generally consistent with BLM resource management objectives and is restricted to assure compliance with the Clean Water act and Endangered Species Acts, requirements for fish habitat, and other aquatic protections. The cumulative effect of vegetative treatments on peak flows across the plan area is displayed in Figure 4-6. Vegetation treatments across all ownerships in all watersheds in Alternatives 2–5 would reduce the risk and magnitude of stand-replacing fires. Consequently, peak flow increases under Alternatives 2–5 are expected to be less than Alternative 1.

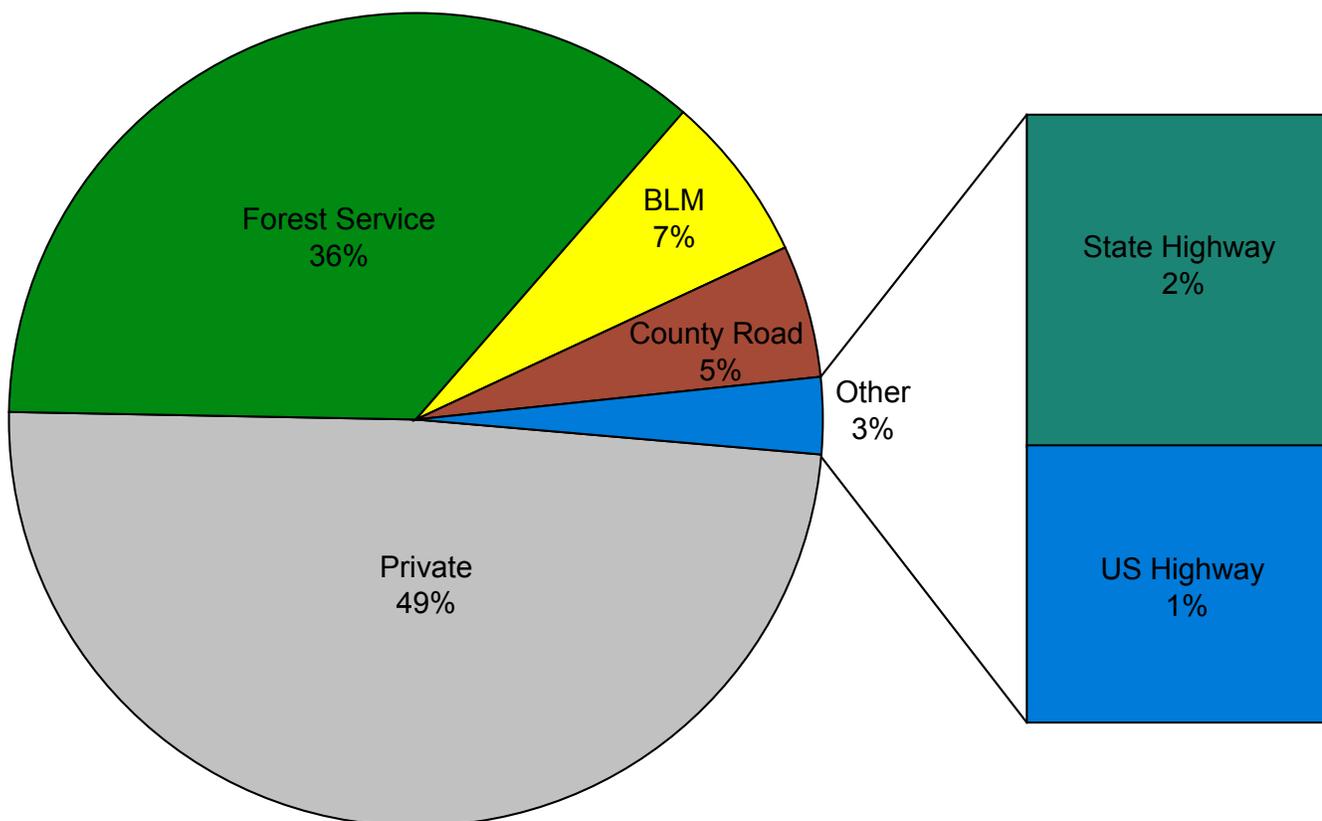
Early spring or fall prescribed burning of native open forest and grasslands by other public and private land managers in the plan area will increase vegetation growth and vigor, rejuvenate brush and increase brush sprouting, stimulate grass production, open some closed canopy, and reduce ladder and ground fuels, all with beneficial effects on aquatic resources.

### Travel Management

Roads in the plan area are managed by state, federal, and county agencies. The current average annual sediment delivery to streams across the entire plan area is estimated at 230 tons (see aquatic indicators section for discussion of methods). The BLM's transportation network of interim routes under Alternatives 2, 4, and 5 would reduce the sediment delivery to streams across the plan area by 4 percent, reducing BLM's proportional effect from 7 to 3 percent of the total sediment delivery from roads (Figure 4-6).

All Federal land managers will implement road management plans (including road construction and decommissioning). County and state road managers are likely to continue to work towards decreasing erosion from

**Figure 4-6. Percent of plan area sediment delivery to stream channels at road crossings by jurisdiction.**



roads and implementing BMPs to reduce the risk of sediment delivery to streams. The combination of the activities is expected to decrease total plan area sediment delivery to stream channels throughout the life of the plan.

### **Riparian Management**

Riparian management across land ownerships in the John Day Basin will continue to use off-channel water development to redirect grazing away from riparian areas. Restoration activities will continue to redistribute dredge tailings and restore floodplain connectivity along rivers and streams in headwater areas. Stream and meadow restoration projects will use rock and plant materials to build in-channel structures. Emphasis will shift to use of vegetative riprap in slack water areas. Land managers will continue to plant and fence woody riparian species. These actions complement BLM aquatic objectives under the action alternatives. Land managers will remove conifers from aspen stands and may exclude these areas from grazing. These actions are intended to release individual aspen trees and rejuvenate the stands.

### **Water Management**

Federal land managers will continue to issue rights-of-way and easements for the operations and maintenance of irrigation and domestic waters facilities crossing or originating on federal land. New science and conservation efforts may be incorporated into the terms and conditions for these water facilities.

Future projects will install tanks to collect rainfall and snow melt to improve or create upland bird habitat. Barbed wire fence will be installed to exclude livestock. Other projects will install perforated pipe collection and similar systems at spring sources, and divert water to livestock watering troughs. The Forest Service will continue to issue special use permits for spring boxes and waterlines associated with domestic water use on Forest Service land. These uses are small in magnitude and do not measurably affect instream flows or water availability, except where they improve floodplain function for capturing spring runoff and late season release.

Federal land managers will continue to permit native (mostly) hay cultivation and grazing on small strips of floodplains. These areas are usually associated with adjacent private agricultural land management. The cumulative effect of BLM water use is negligible in the face of the other water users in the basin.

### **Lands and Realty**

Landowners continue to seek opportunities to consolidate ownership of federal, state, and private lands. Assuming that national trends in the migratory patterns of retirees to the inland Northwest continue, private lands are likely to become subdivided into smaller parcels for retirement homes and recreation uses. Road-stream crossings and watershed cover changes are likely to increase with increased population and recreation uses.

The Forest Service will continue to issue special use permits for rights-of-way of primary power lines with 40-foot poles across the plan area. Other utility corridor permits may be for buried utility corridors. The number of communication corridors and sites, such as fiber optic cable and cell towers, is likely to increase with increasing demand.

### **Livestock Grazing**

The Forest Service will continue to authorize and permit livestock grazing on most of their allotments. Reauthorizations will likely continue according to current grazing management. Grazing management will be modified in authorizations if existing grazing management does not demonstrate maintenance of desired conditions or movement toward desired future condition described in Forest Land and Resource Management Plans. A few Forest Service allotments may be removed from permanent allotment status. Fencing is likely to continue within and around Forest Service allotments. Fish habitat and water quality concerns may lead to development of off channel livestock watering sites and water gaps. Because of requirements of federal land management planning criteria associated with aquatic resources, all of these activities will combine with BLM management to improve water quality and ecological condition of aquatic resources.

### **Mining**

The Forest Service will analyze existing and proposed mining plans of operations for active mining operations, such as those within the Lower Granite Creek Watershed. Land managers will continue to close abandoned

mines by filling in adits (see glossary), trenches, and shafts with earth and rock from existing mine spoil piles and recontouring slopes adjacent to work area. While these actions are likely to move the landscape toward attainment of water quality standards, the rate of recovery cannot be measured because it is dependent on funding.

### **Planning**

The Forest Service will use the same Aquatic Framework from ICBEMP to update their forest plans as the BLM used to develop the aquatic conservation strategy in Alternatives 2–5. This will afford an opportunity for addressing issues similar to those addressed in this BLM plan. Forest Service plans add flexibility and resource protection. Forest Service plans may establish special management areas or zones with specific resource or use emphasis. For example, current Forest Service plans established Research Natural Areas, such as the Shake Table plateau between Murderer’s Creek and South Fork Murderer’s Creek. Aquatic restoration planning and implementation by the Forest Service and other Designated Management Agencies (DMAs) are likely to result in at least minor improvements of all the indicators of aquatic condition and protect the source water and domestic water supplies. Designated Management Agencies are responsible for implementing actions to attain their portions of TMDLs. Ninety-eight percent of domestic water use in the plan area is on private lands, one percent is on BLM, and one percent is on Forest Service land, so the relative impact of BLM domestic water management is very small. However, the BLM has a larger proportion of plan area Source Water Protection Areas on BLM-administered lands (14%).

### **Recreation**

Forest Service campground boundaries will continue to be adjusted to relocate sites away from streams and lentic areas, accommodate increased recreation use and achieve other resource objectives. Recreational camp sites will likely increase and will include attributes such as handicap accessible tables, fire rings, concrete vault toilets, gravel parking spurs and access roads, bulletin boards, signs, shelters for winter and summer use, and possible placements of boulders around campground perimeters. Land managers may remove and replace toilets in or adjacent to existing footprints. Some projects will relocate parking areas, construct new sections of trail, and adjust interpretive signing. In addition, fences will be constructed to minimize conflict between recreation and other uses. Increased recreation may affect attainment of some aquatic objectives relating to sediment and riparian vegetation. However, management agencies have a suite of BMPs available to mitigate or remove these effects on a case-by-case basis.

### **General**

Overall, all alternatives maintain traditional land uses in the area. The alternatives are not likely to increase urbanization or other land uses that dramatically impact aquatic resource by increasing peak flows, amount of household toxins, stream crossings, fill of floodplains for development, and other effects.

The cumulative effects of current and reasonably foreseeable actions are not likely to exceed thresholds for acceptable water quality standards, fish habitat conditions, beneficial water uses or aquatic species habitat conditions as measured by the aquatic objectives. In general, requirements of the federal land management planning criteria associated with aquatic resources (Appendix A) will guide a third of the plan area managed by federal agencies toward improved water quality and condition of aquatic resources. This will complement the effects of BLM actions in the plan area.

Water quality limited streams are those listed under the Clean Water Act Section 303(d) or those not meeting the Total Maximum Daily Load (TMDL) allocations. After preparation of TMDLs, all Designated Management Agencies will submit plans for how their portions of the water quality limited streams will attain the TMDLs.

Alternative 1 did not directly address water quality limited streams on BLM lands. Alternatives 2–5 address water quality limited streams and provide management direction for creating and implementing water quality restoration plans. Under Alternatives 2–5, the cumulative effects of BLM’s management of water quality limited streams are proportional to the miles owned. The BLM is the DMA for approximately 10% of the plan area miles of water quality limited streams. Most of these listings are due to water temperature and sediment. Other water quality parameters of pH, dissolved oxygen, *E. coli*, or fecal coliform are aligned with streams also listed for water temperature. Under Alternatives 2–5, these parameters would be addressed with BMPs and management actions similar to those used for water temperature. The other 90% of water quality limited streams owned by private

landowners, the state, or the Forest Service will be addressed by other DMAs. These DMAs (including the Forest Service, Oregon Department of Agriculture, and Oregon Department of Forestry) are responsible for enacting BMPs and restoration work on these streams in order to meet water quality standards and TMDLs. Therefore, BLM's efforts will add to the cumulative efforts required to restore water quality to state standards or attain TMDLs over the life of the plan.

## Wildlife

Priority Species and Communities were used in this analysis and identified through the Conservation Action Planning process developed as part of the BLM Conservation Learning Network. The BLM Conservation Learning Network is a pilot project sponsored by the BLM Washington Office to assist BLM RMP teams in achieving BLM Land Use Planning goals and objectives (BLM H-1601-1) for priority habitats and species. The JDB RMP Team was one of four teams from the BLM that participated in this pilot.

The BLM Conservation Learning Network was developed under a National Fish and Wildlife Foundation grant sponsored by the BLM Washington Office. Planning tools and processes were developed via cooperative effort among the BLM, The Nature Conservancy, the Idaho Department of Fish and Game, and the Colorado Natural Heritage Program. The project evolved from a 5-year Assistance Agreement between the BLM and The Nature Conservancy to develop planning tools for RMP use.

Priority Species or Communities were identified to address the habitat needs of all species on the Interagency Special Status/Sensitive Species Program list (ISSSSP - July 2007; Appendix H), Partners in Flight focal species, and locally important species known or suspected to occur within the plan area (Appendix O). The Priority Species and Community concept is a stepped down assessment method of the source habitat concept utilized in the Interior Columbia Basin Ecosystem Management Project (ICBEMP), which was a large scale assessment that encompassed the entire Interior Columbia Basin, including the plan area.

The assessment of Priority Communities enables us to display effects to groups of species rather than individual species. Priority Communities are based on groupings of biophysical settings (BpSs) and include forestland; rangeland; shrubland; juniper steppe; grassland; riparian; and cliffs, canyons, and caves. Appendix F displays the BPS composition of each of the Priority Communities, except for cliffs, canyons, and caves. For a more detailed description of BpSs, see Appendix E. Appendix O summarizes habitat associations for priority species. Corresponding amounts of habitat within ARV by biophysical environment are displayed in Appendix E. Appendix Q provides a summary of species status associated with riparian habitats within the planning area.

Analysis of the environmental consequences of the alternatives on wildlife considered the following key resources or resource uses: vegetation, fire and fuels, aquatic resources, wildlife, caves, livestock grazing, recreation, access and transportation, scenic byways, energy and minerals, lands and realty, and agricultural lands.

Proposed management of the following resources/programs have no new actions proposed or would have no anticipated impacts at this scale to wildlife: Soils, Air Quality, Vegetation (special status plants and noxious weed control), Wild Horses, Native American Uses, Paleontological Resources, Cultural Resources, and Hazardous Materials.

## Wildlife Indicators

The following indicators were used to compare and assess effects:

- **Quantity, quality, and spatial distribution** of wildlife habitat are indicators of effects to species (see Appendix O). The primary indicator of quantity for general habitat types is the Acceptable Range of Variation (ARV) for vegetation. BpS descriptions include structure, canopy cover, and patch size information. Each of these features as well as the juxtaposition of foraging, reproductive, and security habitat determine the quality of habitat. Some wildlife habitat quality is also dependent on special features like snags and large down wood.

- **Forage availability, composition, quantity, and quality** indicate how habitat affects the vigor of individual wildlife species.
- **Composition, quantity, and quality of vegetation** surrounding caves are an indicator of the quality of wildlife habitat provided by a cave.
- **Off-road use by motorized vehicles** is an indicator of disturbance to wildlife life cycles, wildlife migration, and decreases in habitat quality. Higher open road densities increase the potential for disturbance of foraging and reproductive activities, habitat destruction, and human induced mortality. Limiting OHV use to designated roads allows wildlife to adjust to human activities, limits the scope of impacts, and decreases the potential for habitat destruction.
- **Timing of disturbance** is an indicator of the effects to wildlife life-cycle requirements and vigor. Disturbance during critical seasons, such as the mating season, may reduce breeding or otherwise alter wildlife vigor.
- **Prescribed and interim road density** is an indicator of habitat quality, quantity, and spatial distribution. As road density increases, habitat quality, quantity and spatial distribution decrease.
- **Habitat security areas** are areas where the level of human disturbance is limited and wildlife sensitive to human disturbance can carry out all or part of their life-cycle requirements.
- **Acres of developed recreation** are an indicator of loss to wildlife habitat quality and quantity. It is also an indicator of how wildlife is spatially distributed across the landscape.
- **Acres with potential for land exchange or sale** indicates potential to alter vegetation and thus wildlife habitat patterns with the correlating change in management emphasis. Land acquisitions or disposals can affect the amount, quality and effectiveness (connectivity) of wildlife habitat and the ability to manage for wildlife resources. Land exchanges that block-up habitat allow for management of larger patch sizes, increase the ability to utilize prescribed fire, and reduce operating costs.
- **Distance bands from an open road** indicate the levels of both security habitat and the amount of fragmentation.
- **Acres available for wildlife food and cover** indicate the amount of food and cover available for upland game species, specifically birds. Irrigated lands in food and cover crops increase the amount and diversity of wildlife utilizing these and surrounding acres.

## Wildlife Assumptions

- Special Management Area designations may include restrictions that would result in less vegetation manipulation designed to benefit wildlife habitat. Maintaining wilderness characteristics, WSRs, ACECs, RNAs, and desired VRM classes may affect wildlife habitat by restricting the methods or tools available to achieve wildlife goals.
- Wildlife habitat needs vary significantly by wildlife species. For a majority of wildlife species, it is generally true that healthy and sustainable wildlife populations can be supported where there is a diverse mix of plant communities to supply structure, forage, cover, and other specific habitat and welfare requirements. Exceptions to this may apply to species requiring large blocks of relatively homogeneous vegetation at least in some seasons (Bailey 1984). Organisms typically evolve adaptations to the usual range of environmental variation (Futuyma 1979). The complement of native wildlife species in the plan area adapted over time to be successful at reproducing within the historical vegetation mosaics. Managing to promote a diverse mix of plant communities is thus an important component of managing for a complement of species, as opposed to a single species concept of management.
- To provide a realistic magnitude and context of effects on wildlife in the plan area, this analysis uses priority vegetation treatment areas to indicate effects of treatments effects in other areas that are assumed to be similar to those detailed for priority areas.
- Designating Back Country Byways reduces wildlife security due to increased disturbance from vehicle traffic.
- Open OHV areas will increase in use due to closures in other areas.
- On lands grazed by livestock and/or wild horses, big game would compete for available forage. In addition, livestock use can alter wildlife habitat structure.

- Direct disturbance to a species and possibly its habitat can affect species' use of an area.
- The ability to limit travel to interim roads is uncertain given the scattered and isolated nature of BLM lands.
- The ratio of commercial agriculture to wildlife food and cover crops will average approximately 50/50 on BLM agricultural land.
- Many basic wildlife population management issues do not differ between alternatives, including the following. The following issues will be addressed during plan implementation by following wildlife guidance provided in Chapter 2 and BLM policy.
  - Habitat requirements for any particular species cannot be met everywhere; species-specific needs are often very site specific.
  - Habitat may be only seasonally available due to elevation, aspect, type of vegetation present and proximity of human disturbance.
  - Habitat conditions will vary due to natural processes and wildlife uses of habitats can change, even if human-caused influences are reduced or eliminated.
  - The interaction of an animal population with its habitat is dynamic, and numbers of animals and their geographic distribution may vary significantly over time. However, there is a critical minimum threshold at which degraded habitat conditions or reduced population size and viability limits the long-term sustainability of the population. There is a similar upper limit that limits further population growth or expansion.
  - Thresholds on wildlife population growth and distribution may be biological, natural or human-caused, and are most important with small, sedentary populations and species with very rigid breeding habitat requirements, including cave bats, and amphibians.
  - Learned and traditional behavior may limit a species' ability to colonize or re-colonize habitat, and adaptability varies by species.
  - Management actions intending to benefit a specific habitat or a priority species will influence other species occurring in that same habitat. Therefore, impacts to wildlife populations and habitat are not discrete since actions may benefit one species while having an adverse, or a beneficial impact on another.

## Analysis of the Effects of the Alternatives on Wildlife

### Vegetation Management Effects on Wildlife

The following analyses of effects are organized by the following Priority Communities: grassland; shrubland; juniper steppe; forest; riparian; and cliffs, canyons, and caves. Priority species by habitat are shown in Appendices O and Q.

#### **Grassland Habitats**

The Palouse Prairie (bunchgrass prairie) historically has been converted to farmland, and introduced nonnative annual grasses have altered fire return intervals. Within the plan area, grassland habitats are currently deficient in mid- to late seral stages and there is a surplus of uncharacteristic vegetation (see Appendix F). Areas of uncharacteristic vegetation include agriculture fields, and the nonnative annual grasses cheat grass and medusahead. Invasive annual grasses reduce native wildlife habitat suitability by altering forage and cover. Invasive annual grasses also perpetuate homogenous landscapes by enabling fire above historic frequencies. Disturbances such as cultivation and more frequent fire have resulted in short plant structure and a lack of cover for the Washington ground squirrel and ground-nesting birds such as the grasshopper sparrow. Some of the grassland priority species (Appendix O) are associated with late seral grasslands, where there is a minor shrub component. These shrubs provide browse for mule deer and antelope and would be important on winter ranges.

Under Alternative 1, grasslands on BLM lands would be managed for mid- to late seral conditions. However, the existing management scheme has not yet served to rectify the deficit of mid- to late seral grasslands and the extent of uncharacteristic vegetation. In practice, the primary emphasis of vegetation management would likely continue to be towards early to mid-seral conditions. Wildlife habitats are expected to continue the trend of decreasing quality under current management (Alternative 1).

Under Alternatives 2-5, less than 15% of the grasslands are within priority vegetation treatment areas (Map 4). Treatments would focus on increasing the quantity and quality of wildlife habitat for priority species. Under

these alternatives, a portion of grassland habitats would be further prioritized for treatments where they occur on big game winter ranges. The action alternatives also include a seasonal timing restriction on disturbances and/or provide for buffer distances for species such as sage-grouse, prairie falcons, antelope, and bighorn sheep, and would serve to reduce disturbance of these populations (Table 2-5). Consequently, vegetation management in general under the action alternatives would increase habitat quality for grassland wildlife species.

Under Alternatives 2–5, grassland habitats would be managed to achieve an acceptable range of variation (ARV) in vegetation structure and composition based on the biophysical setting (see Appendix F) and move uncharacteristic vegetation back into native species, where possible. The result would be to eventually increase the quantity and quality of grassland habitats in priority vegetation treatment areas.

### ***Short- and Long-term Effects of Vegetation Treatment Types on Grasslands***

Fire treatments in grassland communities cause a short-term loss of nesting cover and loss of seed crop and in some cases reduction of insect populations for foraging. The majority of these effects last less than five years. In areas with healthy native herbaceous cover, total grass cover and vigor is also improved for several years resulting in higher value hiding, nesting, and foraging habitat.

Grassland communities are fire adapted systems; however, fire can cause an increase in the dominance and spatial distribution of annual grass composition. Alternative 1 would continue suppression of all wildfires, and current prescribed fire treatment levels in rangelands (including grasslands) of approximately 2,000 acres per year (Table 4-5). Alternatives 2–5 would treat 2,000 rangeland acres per year with prescribed fire, and would additionally allow for 1,500 acres of fire management with fire to achieve resource objectives. The action alternatives preclude fire to achieve resource objectives in areas of high annual grass composition. Over time, the health and vigor of grassland communities would be less under Alternative 1 than Alternatives 2–5.

In the short term, seeding would improve habitat quality and quantity by restoring native habitats used by priority grassland species. Restoration of native grass habitats would increase the year-round habitat and forage for all the priority species. Restoration seeding designed in a mosaic pattern would increase overall quality and quantity of big game habitat. An increase in the health and vigor of the shrub and herbaceous layer improves palatability for big game species. Alternatives 2–5, which have more specific prescriptions for mosaics of native grass and shrub restoration, would increase habitat quality, quantity, and spatial distribution more than the less prescriptive Alternative 1.

Over the long term, moving the landscape toward a more viable and sustainable vegetative structure and composition would meet the habitat needs of priority grassland wildlife species. Habitat conditions provided under the action alternatives would provide a mosaic of habitat features such as large expanses of perennial native grasses interspersed with low density patches of shrubs. Existing stands of perennial bunchgrasses are expected to be retained and uncharacteristic classes and overabundance of early seral classes would be replaced. Management under Alternatives 2–5 would be focused on achieving ARV, which should have a greater positive effect on populations as a whole than alternative 1. Long term detrimental effects of Alternatives 2–5 to big game are not expected due to the anticipated size and design of treatment areas. Viable big game habitat is expected to occur across the landscape and retained over time under the action alternatives.

### ***Shrubland Habitats***

The combination of fire control and excessive grazing allow juniper expansion and reduce the quantity and vigor of understory species. These sites are often invaded by nonnative annual grasses or noxious weeds. Within the plan area, most of the shrubland habitats currently include a surplus of early seral stages and a deficit of mid- and late seral stages, and most include significant amounts of uncharacteristic vegetation, both on and off BLM lands (see Appendix F). These changes in habitat structure and composition have had a variety of effects; for example the quality of sage-grouse brood-rearing habitat declines due to reduced understory species diversity. In the Prineville District as a whole, juniper expansion and displacement of historic sagebrush has occurred dramatically. Current sage-grouse range and habitat within the District is limited primarily by juniper encroachment (Hagen 2011).

Under Alternative 1, there exists no direction for rangeland vegetation. Past vegetation management practices have resulted in excess early and late seral and uncharacteristic conditions. The lack of natural fire has resulted

in expanding juniper populations and densities. Shrublands with juniper occupation provide increased wildlife species richness until the juniper dominance impacts the shrub and herbaceous component. Without treatment these stands lose their diversity of wildlife and become resistant to fire due to the reduction of understory plants. Continuing this trend under Alternative 1 may adversely impact ground-nesting birds and shrub-dependent species. The loss of understory also reduces forage value for small mammals and large herbivores.

Under Alternatives 2–5, approximately 16% of BLM shrublands are within priority vegetation treatment areas (Map 4). These habitats are dominated by encroaching juniper or other uncharacteristic vegetation, and treatments would focus on reducing juniper and increasing native bunchgrass. Under these alternatives, a portion of shrubland habitats would be treated to enhance big game winter habitat quality and provide sage-grouse habitat, consistent with action statements related to juniper encroachment described in the Greater Sage-grouse Conservation Assessment and Strategy for Oregon (Hagen 2011). The action alternatives also include a seasonal timing restriction on disturbances and/or buffer distances for sage-grouse, ferruginous hawks, antelope, and bighorn sheep, which would serve to help minimize disturbance to these populations (Table 2-5). Consequently, vegetation management in general under the action alternatives would increase habitat quality and quantity for shrubland wildlife species more than continuing the vague existing management under Alternative 1.

### ***Short- and Long-term Effects of Vegetation Treatment Types on Shrubland Habitats***

In all alternatives, anticipated short-term effects of fire treatments on shrubland priority species would generally reduce shrub cover since many of these species require shrubs for nesting, hiding cover and food. Generally, big game species would benefit from the increased forage and quality winter habitat that would result from fire treatments. If too much sagebrush is removed from a broad area, winter habitat quality could decrease. Since the action alternatives (Alternatives 2–5) call for relatively greater amounts of rangeland fire treatments through fire to achieve resource objectives than Alternative 1 (Table 4-5), they may also have more short-term displacement of, and habitat loss for, individuals of select priority shrubland wildlife species.

Short-term effects from mechanical treatment of juniper is expected to benefit bird species and pygmy rabbits by opening areas up for foraging and nesting habitat, while reducing perches for aerial predators. Mechanically treating shrub BpSs where juniper canopy cover exceeds 40% would improve the quality of the shrub and grass habitat components and increase the availability of nesting and foraging habitats for land bird species. An exception to this may be where the lark sparrow may require some use of taller tree canopies. The mechanical development of mosaics in growth forms increases lark sparrow habitat quality by providing edge effects within lark sparrow habitat. Reductions in habitat in Alternative 1 would not consider the amounts or types of treatments necessary to retain sufficient habitat for lark sparrow and other species that utilize juniper. The action alternatives would retain juniper in densities and locations in balance with other seral conditions in shrublands.

Mechanical treatments are expected to increase forage and decrease hiding cover in the short term. Alternative 1 provides no direction for the pattern of mechanical treatments. Under Alternatives 2–5, mechanical treatments would be designed in a mosaic pattern to improve overall quality and quantity of big game habitat. A positive response in the health and vigor of the shrub and herbaceous layer is expected and would improve palatability for big game species. Detrimental effects to these species could become evident if treatments were conducted over too large of an area under any alternatives.

All alternatives propose restoration seeding. Alternatives 2-5 provide additional direction about the pattern of seeding and priorities for restoration treatments, whereas Alternative 1 does not. The criteria associated with restoration treatments in the action alternatives is expected to benefit big game winter ranges, sagebrush habitat patch size, and riparian habitats. Restoration efforts along drainages where well-drained deep soils occur would increase the quantity of habitat for pygmy rabbits.

Over the long term, moving the landscape toward a more viable and sustainable range of vegetative structures and composition would meet the needs of priority shrubland wildlife species. Habitat conditions that provide a mosaic of habitat features, such as open patchy shrubs, large patches of sagebrush, dense canopy cover of sagebrush, and tall shrubs, would increase wildlife habitat quality and quantity.

Prescribed fire and wildfire reduce the amount of shrub habitat in the short term. If the fire return frequency or size of burns is too large the amount of shrub habitat available for 20–100+ years can be insufficient to support

species that require >10% shrub cover. The action alternatives would result in more fire in shrublands due to fire to achieve resource objectives. Management direction contained in the action alternatives regarding the conditions and locations where fire to achieve resource objectives would be allowed based on annual grass and noxious weed composition should limit the amount and extent of detrimental fire effects. Fire size, frequency, and intensity within ranges appropriate for the BpSs would maintain stands in early to mid-seral condition where herbaceous growth is vigorous and provides cover and forage. Shrub stands without a healthy herbaceous component provide a far lower quality of foraging and reproductive habitat.

Through time and without further disturbance, areas currently in an early seral condition are expected to transition to mid-seral without further disturbance. The action alternatives identify areas where mid-seral shrub conditions are limited and direct treatment is toward mechanical rather than fire treatment type. Alternative 1 does not contain this direction.

Alternative 1 would manage portions of the planning area with a cover: forage ratio; however, this ratio is not specific to the vegetative potential of the site. Meeting this ratio in shrubland BpSs can result in a loss of large blocks of shrub dominated habitat necessary for species like sage-grouse, antelope, and sage-sparrow. The action alternatives would allow for larger treatments sizes in shrublands when required by existing conditions because patch size requirements are tied to the BpS descriptions. This can reduce the amount of hiding cover for some big game species and nesting habitat for species like horned lark, but would increase habitat for ground level nesting species and species that require large blocks of unfragmented sagebrush habitat. The overall amount of edge habitat may be less under Alternatives 2–5 than Alternative 1 due to patch size requirements. However, management under Alternatives 2–5 would still be focused on achieving ARV, which would direct patch size and seral structural conditions toward those specific to BpS site potential and thus provide habitat for species that require larger contiguous blocks as well as those that utilize edge. Managing to meet seral structural stages across diverse BpSs on the landscape would ensure variability of cover and forage conditions but not to the exclusion of one or the other.

### **Western Juniper Steppe Habitats**

Western juniper steppe BpS habitats are typically associated with rocky rims or other harsh sites where a physical barrier precluded natural fire from burning on a frequent basis. Larger percentages of these sites were in late seral conditions or old growth (see glossary) in the past. Old growth trees and stands provide hollow trees for primary and secondary cavity nesters, crevasses for small mammal dens, berries that provide a food source, perch sites for raptors, and many other unique wildlife habitats.

Many of these sites have seen an increase of post-settlement juniper in the understories. This increase in juniper cover alters understory conditions. The increase in understory juniper puts the stands at greater risk of burning until understory trees become of a size where they no longer provide ladder fuels to the larger structure trees. Over time these stands again become resistant to fire due to the increased competition stress. Increased competition stress and higher potential for fire put these stands at a greater risk of stand replacement. Old growth conditions in juniper would take hundreds of years to return.

All alternatives would direct management to retain late seral conditions on the majority of these habitat types.

The action alternatives provide more specific direction in that they identify BpS locations where this management should occur as opposed to Alternative 1, which is not location specific. Alternative 1 does not provide direction for prioritizing treatments to achieve ARV of juniper steppe habitats. Under Alternatives 2–5, juniper steppe has 33% of its area within priority vegetation treatment areas (Map 4). Because the action alternatives are more site specific relative to old growth retention locations, these conditions would be more sustainable through time. The action alternatives also provide specific direction for the retention of old growth trees and stands whereas Alternative 1 does not.

Due to the prioritization of treatments in Alternatives 2–5, it is expected that old growth conditions in juniper steppe would be better protected in the action alternatives than Alternative 1.

### **Forested Habitat**

As a result of current and past management, dry forests (ponderosa pine, mixed conifer, and drier Douglas-fir) generally have denser understories, fewer large trees and more shade-tolerant species than what occurred historically. Currently, moist forests (mixed conifer, moister Douglas-fir, white/grand fir, and lodge pole pine) are denser with higher levels of ground fuels than what occurred historically.

Two forested areas currently contain the oldest and largest trees in the plan area. One is located in Timber Basin (less than 500 acres) at the south base of Rudio Mountain and the other is isolated near the north face of Aldrich Mountain (Big Canyon Creek, approximately 1,100 acres). Both areas are similar and have old multi-story forest characteristics. They have some trees (ponderosa pine and Douglas-fir) in excess of 40 inches dbh in the overstory and an understory of mixed conifers (both shade tolerant and intolerant species). Western larch communities are declining.

Under Alternative 1, forest management is focused on sustainable commercial harvest, minimizing losses from insects and disease, thinning; and maintaining site productivity. Alternative 1 allocates 135,719 acres as Timber Management Units (TMU) where the primary focus of management is on timber production. This focus would result in less large structure habitat for species like white-headed and pileated woodpeckers and reduced cover values for big game. Continuing current management direction would also result in further increases of live and dead fuels. This fuel buildup would eventually result in fires that reduce habitat quality and quantity for species dependent on large structure like the white-headed woodpecker.

Under Alternatives 2–5, approximately 40% of the forested habitat is identified as priority vegetation treatment areas (see Map 4). Alternatives 2–5 propose greater amounts of mechanical and prescribed forested treatments than Alternative 1. Under the action alternatives, habitats dominated by encroaching younger tree species with accumulations of dead fuel or abundant uncharacteristic vegetation would be targeted for treatment, thus increasing the quantity and quality of wildlife habitat for priority species. Under these alternatives, a portion of forested habitats would be further prioritized for treatments where they occur on big game winter ranges.

The action alternatives also include a seasonal timing restriction and/or buffer distances for flammulated owl, Townsend's big-eared bat, mule deer, and elk, which would serve to help protect these populations (see Table 2-5). Generally, vegetation management under the action alternatives would increase the habitat quality and quantity for most forest wildlife species.

### ***Short- and Long-term Effects of Vegetation Treatment Types on Forested Habitat***

All of the alternatives propose a similar amount of prescribed burning in forested habitats. However, Alternative 1 calls for suppression of all wildfires. Alternatives 2–5 allow for the use of fire to achieve resource objectives, which could result in more of the plan area burning.

Prescribed fire generally reduces undesirable tree species and or age classes and allows for better forest health. If fires are suppressed and prescribed burning or mechanical treatments are not used to restore and maintain forest health, a stand replacement event could eventually occur through insect or disease mortality and/or wildfire. Loss of large structure trees decreases habitat quality and requires many years for renewal of the habitat. Big game species would benefit from fire treatments, unless too much tree cover is removed. Prescribed and managed fires create mosaics of forage and cover for forest habitat wildlife species. Big game prefers foraging in burned areas compared to unburned areas, although preference may vary seasonally. This preference may indicate an increase in plant nutrients, which usually occurs following fire.

Mechanical treatments would target shade tolerant understory trees much more specifically than prescribed fire. The use of mechanical treatments in forested habitats prior to prescribed fire would result in changes in seral structural conditions consistent with the currently identified ARV treatment needs. Mechanically treating dense forests where canopy cover exceeds 40% would improve the quality of the understory vegetation, which increases the availability of ground and shrub nesting and foraging habitats, but would reduce cover values.

Over the long term, moving the landscape towards a more viable and sustainable range in vegetative structure and composition would meet the needs of priority forest wildlife species. Alternatives 2–5 are expected to move the landscape more quickly toward viable stable ranges in vegetation than Alternative 1.

Snags and large down wood provide nesting/denning and foraging habitat for a host of priority wildlife species. Alternative 1 lacks specific direction on retention of large structure, snags and downed logs. The action alternatives provide direction for the retention of snags, large down wood, and old growth character trees. Snag and large down wood retention levels prescribed in the action alternatives are tied to the site productivities and densities expected under natural disturbances. Through time these within stand characteristics would add to the character of stands and enhance their ability to meet large structure (old growth) objectives sooner and more completely than Alternative 1.

### ***Cliff, Canyon, and Cave Habitat***

Appendix O lists Priority Species associated with cliff, canyon, and cave habitats. Alternative 1 provides no specific guidance for management actions in cliff, canyon, or cave habitats. The action alternatives also include a seasonal timing restriction and buffer distance for prairie falcon nests, bighorn sheep, and spotted and cave-dwelling bats (Townsend's big-eared, Pallid, fringed myotis), which would help protect these populations (Table 2-5).

### ***Short- and Long-term Effects of Vegetation Treatment Types on Cliff, Canyon, and Cave Habitat***

Vegetative treatments directly adjacent to cliffs and caves can alter the micro habitat of these sites, reducing their potential to be used as roosts, nests, or perches. Removing vegetation can also expose sites to predation or human intrusion. Alternative 1 contains no specific direction for the protection of vegetation immediately adjacent to these features, whereas the action alternatives do.

Vegetative treatments (both mechanical and prescribed fire) near, but not directly adjacent to cliffs and caves can benefit foraging habitat in these areas. Riparian and meadow habitats near cliffs provide foraging habitat for species like prairie falcon and golden eagle. Riparian and open forested habitats near cliffs or caves provide foraging opportunities for species like spotted bats and Townsend's big-eared bats. Through time, increased ability to treat riparian habitats, emphasis on forested treatments, and greater amount of treatment expected under the action alternatives would result in more productive foraging conditions associated with cliffs and caves than under Alternative 1. The greater amount of fire treatments associated with the action alternatives would have more short-term effects to individuals and localized populations; however, the majority of cliff, canyon, and cave species are highly mobile and can travel many miles to forage.

For bighorn sheep, fire generally improves and increases forage and increases visibility for escape. Fire treatments conducted on poor condition habitat may eliminate bighorn sheep habitat. When non-sprouting plant forage is eliminated within the treatment area or when too much area is burned, forage would be inadequate until the next growing season.

Restoration of native vegetation through seeding would improve the quality and quantity of the habitats used by cliff, canyon and cave species. Alternative 1 provides no direction for the pattern or prioritization of restoration seeding. Under Alternatives 2-5, restoration seeding would be designed in a mosaic pattern, which would increase the edge effect and would be a positive benefit to wildlife.

The specific direction in the action alternatives to manage vegetation to retain micro climates associated with cliffs and caves combined with the increased ability and amount of treatment to surrounding foraging habitats would provide better habitat quantity and quality than Alternative 1.

### ***Summary of Vegetation Management Effects on Wildlife***

The quantity and quality of wildlife habitat that would be produced under the action alternatives would come closer to meeting ARV objectives based on treatment types and amounts than Alternative 1. The targeted treatment types and prioritization of treatment locations based on resource values, including key wildlife habitats, in the action alternatives would balance current habitat shortages, provide a more appropriate balance of cover/forage and patch size conditions, and retain within stand characteristics such as snags, down wood, and old growth trees more directly than Alternative 1. Consequently, the action alternatives are more likely through time to provide a balance of wildlife habitats across the planning area.

## Fire and Fuels Management Effects on Wildlife

Under Alternative 1, there would be 22,304 acres designated as WUI, which would continue to be managed to reduce hazardous fuels that pose a risk to communities at risk. Alternative 1 does not provide any more specific direction about fuels treatments around communities. Alternatives 2–5 provide direction to design fuels and vegetation treatments to consider not only public and firefighter safety, but also wildlife habitat and corridors in addition to other resource issues. Alternatives 2–5 also aim to achieve objectives for hazard reduction in WUI and also ARV across larger areas. The only exception would be the approximately 5,000 acres of BLM land where intense vegetation treatments would emphasize fire safety over wildlife values. The WUI objective of reducing fire hazard under Alternative 1 could result in more intense fuels treatments across the plan area than the Alternatives 2–5. Management under Alternative 1 would lead to more vegetative and habitat conditions outside the requirements for many priority species. The action alternatives would not.

The action alternatives designate 85,391 acres of WUI; 22,304 acres of Full Suppression; and 434,306 acres of fire to achieve resource objectives. Under the action alternatives, more acres of vegetation would be treated for community safety and to meet ARV objectives. In addition, outside of Full Suppression areas, the action alternatives require treatment projects to be designed to assure balances between attaining ARV and FRCC objectives. This would improve the habitat quality and quantity for priority wildlife species more under Alternatives 2–5 than Alternative 1.

Alternative 1 lacks designated areas for fire to achieve resource objectives, which would limit the ability to utilize natural fire starts to improve or maintain landscape health. Fuel treatments in the Full Suppression areas would continue to be for the primary purpose of reducing fire risk, and wildlife objectives would not be considered for those areas. Utilization of fire to achieve resource objectives under the action alternatives would reduce treatment needs to meet ARV objectives. This could achieve better habitat conditions quicker than Alternative 1, with greater benefits to priority species.

## Aquatic Resource Management Effects on Wildlife

Existing aquatic resource management direction under Alternative 1 provides guidance at the scale of the entire Interior Columbia Basin; Alternatives 2–5 generally provide more locally specific management objectives. This area-specific management would result in attainment of a greater amount of wildlife objectives, including providing habitat to meet ODFW management objectives for deer, elk, and pronghorn antelope. Alternative 1 designates 51,260 acres to be managed for riparian objectives; Alternatives 2–5 identify 139,673 acres to be managed for riparian objectives. In Alternatives 2–5, there would be almost three times the area managed for riparian values; this would increase habitat quality and quantity for priority wildlife species (including the bald eagle and tricolored blackbird) by providing more quality habitat for activities such as nesting, foraging, and roosting.

Alternative 1 lacks any measures for attaining specified goals while Alternatives 2–5 identify measures of attainment to track progress in achieving management objectives through the life of the plan. This specificity would help to maintain and improve riparian habitats, which is consistent with supporting healthy, productive, and diverse wildlife populations. Under Alternatives 2–5, approximately 35% of riparian areas are identified within plan area priority vegetation treatment areas.

Alternative 1 also does not propose any restoration, nor identify actions needed to attain restoration of riparian habitat. Alternatives 2–5 identify active restoration actions for riparian habitat with methods that include fire, mechanical treatment, seeding, and targeted herbicide use. An increase in the health and vigor of the shrub and herbaceous layers are expected from attainment of aquatic restoration objectives and actions included in the action alternatives. This enhanced vegetative condition would improve palatability for big game species. The effects of fire, mechanical, seeding, and herbicide treatments on priority species are described in more detail below.

## Fire Treatment Effects on Wildlife

Prescribed fire is a tool proposed for use in realigning vegetation structures and classes to meet ARV objectives. All alternatives are similar in the expected amount of prescribed burning per year (Table 4-5); however, Alternative 1 calls for suppression of all wildfires, whereas the action alternatives allow for the use of fire to achieve resource objectives. The use of fire to achieve resource objectives in Alternatives 2–5 would increase riparian wildlife habitat quality and quantity relative to Alternative 1.

## Mechanical Treatment Effects on Wildlife

Mechanical treatments are also proposed as a means to alter vegetation structures and classes to meet ARV objectives. Mechanical treatments in riparian areas generally control encroaching undesirable woody species. The resulting increase in diversity and productivity of riparian and aquatic plant communities would increase the associated wildlife habitat quality and quantity. Alternatives 2–5 propose greater amounts of mechanical treatments in forestlands (Table 4-5) and in riparian areas for restoration purposes under the Aquatic Conservation Strategy (ACS), which would bring about greater increases in habitat quality and quantity of riparian associated species than Alternative 1.

## Seeding Effects on Wildlife

Seeding would increase habitat quality and quantity by restoring native habitats used by priority species. All alternatives include direction on the use of native seed. The action alternatives provide greater direction on the patterns of seeding and more specific BMPs for designing seeding actions to benefit wildlife than Alternative 1.

Restoration of native tree, shrub, and herbaceous vegetation would increase the year-round habitat, forage, and cover for riparian wildlife species, potentially to a greater degree in the action alternatives than Alternative 1.

## Herbicide Use Effects on Wildlife

Herbicide use for noxious weed control would be used as a step in re-establishing native riparian vegetation for associated wildlife species. The alternatives do not differ in terms of direction on herbicide use, but the action alternatives, through the ACS, provide for the use of herbicides to achieve aquatic objectives for native plant diversity and stream function.

Eliminating and/or reducing weedy species would help maintain or increase existing priority wildlife species habitat quantity and quality, possibly to a greater degree under the action alternatives than Alternative 1.

## Livestock Grazing Management Effects on Wildlife

Grazing allotments under all alternatives are classified into two livestock grazing authorization categories (also see Livestock Grazing, Chapter 2, and Appendix J):

- Open, with potential for Reserve forage.
- Potentially close upon relinquishment by the lessee and if existing ecological and/or social conflicts with livestock grazing are not mitigated.

In Alternative 1, almost all grazing allotments would be Open over the life of the plan (see Table 4-13). The action alternatives would in general have a greater amount of area ungrazed on a consistent basis. There is potential for grazing livestock to compete with big game for forage resources. The risk of forage competition between livestock and big game would be the greatest under Alternative 1, assuming all grazing permits are relinquished over the life of the plan. If competition occurs, it is not expected to be at levels that would threaten achieving ODFW management goals. Under all alternatives, annual adjustments in the timing, duration, or location of grazing uses would allow for adjustments necessary to address grazing management issues associated with wildlife habitat identified through Standards and Guides or other processes on allotments that are being grazed.

The likelihood of disruptions to nesting or other activities of priority species such as the grasshopper sparrow by livestock grazing activities would be the greatest under Alternative 1 and the least under Alternative 2. Livestock

**Table 4-13. Acres of BLM Lands by Potential Grazing Availability Category.**

Potential Grazing Status*	Units	Alternatives				
		1	2	3	4	5
Open	Acres	395,495	56,382	188,326	182,845	186,711
Close	Acres	0	385,692	253,748	259,229	255,363

\* Alternative 1 acres do not include some North Fork John Day River lands. All actions in Alternatives 2-5 depend on permittees voluntarily relinquishing their permits.

water source developments under any alternative would provide additional sources of drinking water for wildlife. However, the expansion of grazing impacts in previously unused areas following water development and fence construction would reduce the amount of ungrazed or lightly used forage for wildlife. This forage is preferred or more productive by some species of wildlife.

Additional livestock fencing would increase the likelihood of death or injury to wildlife as a result of collision with and tangling in fencing. Although the amount of fencing is not specified in any alternative, any shifts from Open to Reserve Forage or Closed (given permit relinquishment) under the action alternatives could include the need for fencing, which may restrict wildlife movement. Properly designed fencing reduces the likelihood of death or injury to wildlife due to entanglement, but restricting the direction of escape may increase the vulnerability of some priority big game (e.g., elk) to predation.

Under Alternative 1, nongame species habitat would be provided largely as a by-product of meeting management objectives for game species rather than as a proactive nongame management objective. Current management direction does allow for some limited proactive measures to specifically benefit nongame species. Alternative 1 would result in upland habitat diversity and structure for nongame species that is evident at a mid-scale but frequently lacking, or with reduced habitat values at the fine scale due to the livestock commodity emphasis.

Alternative 2 would provide for the highest level of quality forage, cover, and structure for wildlife since areas unallocated to livestock grazing would provide for a very high level of quality forage, cover, and structure in sagebrush, mountain shrub and other upland species habitats. Unallocated areas would become reserves in which the combined values of forage, cover, and structure would be maximized for wildlife such as antelope, deer and elk. The absence of livestock trampling and utilization would increase herbaceous cover that would benefit ungulate forage, ground nesting birds, and small mammal hiding cover and forage.

Based on the preference of some animals, such as elk, to seek out areas periodically grazed, an increase in the amount of wildlife use on private land would be likely to occur in several local areas. Under Alternative 4, cumulative consequences could result from changes in wildlife use, such as shifts of big game onto private land. These effects would be mitigated by periodic light grazing and/or prescribed burning during seasons that have the least effect on wildlife species in the area. Beneficial impacts to wildlife forage, cover, and structure would be accrued in virtually all of the alternatives where grazing use is removed. However, big game may still move on to adjacent private lands to seek preconditioned forage if not enough is provided on BLM lands.

Alternative 2 would benefit priority wildlife species the most as it would have the highest amount of acreage that would potentially be closed to grazing and the lowest amount open (Table 4-13).

Effects to wildlife associated with wild horse management include competition with big game for water resources during droughts, and local depletion of adequate forage and cover for wildlife. Under drought conditions, the presence of wild horses would increase competition for water which would periodically result in additional mortalities of pronghorn antelope, and to a much lesser extent, mule deer. The size and allocation for the wild horse herd management area does not differ between alternatives; hence, there would be no measurable differences in effects to wildlife between alternatives.

### **Transportation Management and OHV Effects on Wildlife**

*“In summary, no terrestrial vertebrate taxa appear immune to the myriad of road-associated factors that degrade habitat or that increase mortality” (Quigley 2000).*

Transportation management actions that affect wildlife include prescribed, interim, and cumulative road densities; habitat security and seasonal restrictions; Back Country Byway designation; Class II rock crawling areas; and OHV designations. Each of these actions can be related to general wildlife effects, namely habitat loss, fragmentation, wildlife displacement, and mortality. The effects of each of these actions on wildlife are reviewed separately below, and are followed by a synthesized summary of effects of Travel Management.

In general, effects of road-associated land management can be direct, such as habitat loss and fragmentation as a result of road construction and maintenance. Effects can also be indirect, such as displacement or increased

mortality of wildlife populations in areas near roads in relation to motorized traffic and associated human activities. High speed roads (state highways and paved county roads outside of the jurisdiction of BLM) have the greatest potential for direct mortality to individual animals (Gunter *et al.* 1998). Roads increase fragmentation of habitats. State highways and paved county roads contribute the most to fragmentation, as they usually have shoulders and require additional clearing of vegetation. Road surfaces and higher levels of traffic create a barrier to movement for some (mostly smaller) species. Under all alternatives, most roads under BLM management have a native surface, are rarely maintained, and do not have shoulders or extra vegetation clearing. This reduces potential effects of fragmentation compared to state highways and paved county roads.

Although road density in and of itself may not be the best measure of habitat effectiveness for wildlife (Rowland *et al.* 2000), the Interior Columbia Basin Ecosystem Management Project (ICBEMP) did one of the most extensive reviews of road-related effects on wildlife to date, and provides a larger context for the discussion of these effects on wildlife. While not prescriptive, ICBEMP used the following road density categories, which are assumed to correspond to varying levels of wildlife habitat quality: none to very low (zero to 0.1 mile per square mile), low (0.1 to 0.7 mile per square mile), moderate (0.7 to 1.7 mile per square mile), high (1.7 to 4.7 miles per square mile), or extremely high (4.7+ miles per square mile) (Quigley *et al.* 1996). In general, road densities greater than 2 miles per square mile reduce habitat security, increase fragmentation, and increase the indirect effect of human activities. The following discussion utilizes ICBEMP categories and the general 2 miles per square mile threshold in part to analyze differences in effects between alternative travel management and OHV direction.

The action alternatives contain both BLM prescribed and BLM interim road densities (defined below). Cumulative road densities from the entire plan area are used to provide a larger context to the effects analysis.

- **Prescribed road densities** represent road density objectives to be used in transportation planning for each Travel Management Area. Prescribed road densities are specified for the action alternatives (Table 4-14, Maps 13A-F and 14A-F), but not for Alternative 1 (except indirectly in the case of Wilderness Study Areas).
- **Interim road densities** represent the road density that would exist in each Travel Management Area until a Travel Management Plan or site-specific plan is completed.
- **Cumulative road density** represents the road density by inclusion of roads within one mile of BLM land, regardless of ownership. The BLM has no control over these additional roads. However, the existence and use of these other roads affect wildlife and their habitats on BLM lands. These cumulative road densities were analyzed to determine the relative contribution of the effects of each alternative and the relative ability of BLM to influence road related effects. Cumulative open road density was calculated using a 1 mile roving window (see ArcGIS 9.2, line density tool).

### **Prescribed Road Densities**

Road density prescriptions set a course of action for travel and access management that takes the needs of wildlife into account. Without road density prescriptions, the number and spatial distribution of roads resulting from management would through time, have uncertain or varying effects on wildlife. Alternative 1 does not prescribe road densities; it would continue management of the existing transportation network. Under the action alternatives, prescribed road densities (calculated on all motorized routes on BLM lands) would be implemented during planning of individual projects or during the development of the Travel Management Plan. Prescribed road densities are averages that are relevant at the level of the Travel Management Area. For instance, individual parcels of BLM land may have densities greater than 2 miles per square mile; however, all BLM lands within a prescription of 2 miles per square mile must average 2 miles per square mile or less across the Travel Management Area (Table 4-14).

Under the action alternatives, road densities would be prescribed within each of six individual Travel Management Areas (see Map 12) based on the need to reduce impacts to key wildlife habitats (see glossary) and provide recreation opportunities consistent with recreation management objectives (see Maps 13A-F and 14A-F, Table 4-14, and Travel Management in Chapter 2). Table 4-14 compares prescribed road densities within each Travel Management Area among alternatives.

If roads are managed under the action alternatives to the allowable density, prescribed road densities in the Upper John Day, Lower John Day, Rudio Mountain, and Sutton Mountain areas would be moderate relative to ICBEMP road density categories. The North Fork and South Fork would be in the high category.

**Table 4-14 Average Allowable Road Density,\*\* Interim Road Density by Alternative, and Approximate Priority Community Composition.\***

Travel Management Area (BLM acres)	Average Allowable Road Density (miles per square mile)	Interim Road Density (miles per square mile)			Priority Community Composition					
		Alt. 1	Alt. 2, 4, 5	Alt. 3	Grassland	Shrubland	Juniper	Forest	Riparian	Cliffs and Canyons
Upper John Day (9,196 acres)	1.15	3.5	1.5	3.5	0%	9%	0%	86%	5%	Low
Lower John Day (119,703 acres)	1.26	1.2	0.4	1.1	10%	85%	0%	0%	5%	High
North Fork (53,884 acres)	1.83	0.6	0.8	2.3	1%	37%	2%	55%	5%	Medium
Rudio Mountain (82,086 acres)	1.04	1.4	0.4	1.4	5%	46%	2%	45%	2%	Medium
South Fork (62,973 acres)	2.00	1.7	0.6	1.6	1%	60%	1%	35%	3%	High
Sutton Mountain (128,768 acres)	1.35	1.3	0.7	1.3	15%	81%	1%	1%	2%	Medium

\* See Appendix O for the specific wildlife species addressed by the Priority Community. See Appendix F for groupings of BpSs into Priority Communities. Approximate BpS compositions are based on visual estimates. Because cliffs and canyons are not a vegetative component, a percentage calculation was not appropriate, so a relative scale of occurrence is provided.

\*\* Average road density is based on percent composition of the Travel Management Area designated in each of the two prescribed road density standards (0 miles/square mile or 2 miles/square mile). Averages display the maximum allowable road density; however, road densities may not be managed at the maximum allowable level. Prescribed road densities are a component of Alternatives 2, 3, 4, and 5 only. Prescribed road densities do not include seasonal closures and thus reflect conditions outside of restricted periods (see Maps 12A-F and 13A-F for Seasonal Restrictions). Wilderness Study Areas in Alternative 1 do not have a prescribed road density; however, existing management direction would preclude any new road construction. Interim and average road densities are based on roads on BLM lands only. Areas with no upper limit to road density for the action alternatives were not included in these figures (approximately 3,971 acres primarily in the Rudio Mountain area).

Figure 4-7 and Table 4-15 illustrate the percentage and acres of key wildlife habitats in each road density category, as depicted by the upper limits of allowable road density. "No limit" means that no road density prescription has been proposed for these lands or alternatives. These upper limits are considered the maximum density allowed to meet wildlife and recreation objectives; they do not necessarily represent the actual road densities that would be maintained over the long term (actual road densities could be less).

Table 4-15 shows that under Alternative 1, elk summer range, and deer and elk winter ranges have the largest amount of area with no road density limits, and hence the largest future risk for wildlife habitat degradation. Differences in seasonal restrictions further distinguish differences in effects among the alternatives, and will be discussed in the habitat security and seasonal restriction section below. While sage-grouse and Washington ground squirrel make up a smaller proportion of the plan area than other key habitats, 100% of their habitats would have road density limits under the action alternatives as opposed to 0% under Alternative 1. The action alternatives vary from each other only in that Alternative 4 has road density limits for all key wildlife habitats. About 2,500 to 4,571 acres in deer and elk winter range and elk summer range would not have road density limits under Alternatives 2, 3, and 5.

Over 95% of all key wildlife habitats would have a prescribed road density under the action alternatives, as opposed to 0% in Alternative 1. The lack of direction for allowable road densities under Alternative 1 assumes a greater risk for road-related effects to wildlife and their habitats from future actions than the action alternatives.

Alternative 1 does not limit road densities in any of the Priority Communities with the exception of Wilderness Study Areas. Most Wilderness Study Areas have a shrubland Priority Community type. Conversely, the action alternatives provide allocations for allowable road density as displayed in Table 4-16.

Figure 4-7. Percentage of key wildlife habitats by prescribed road density class on BLM lands.

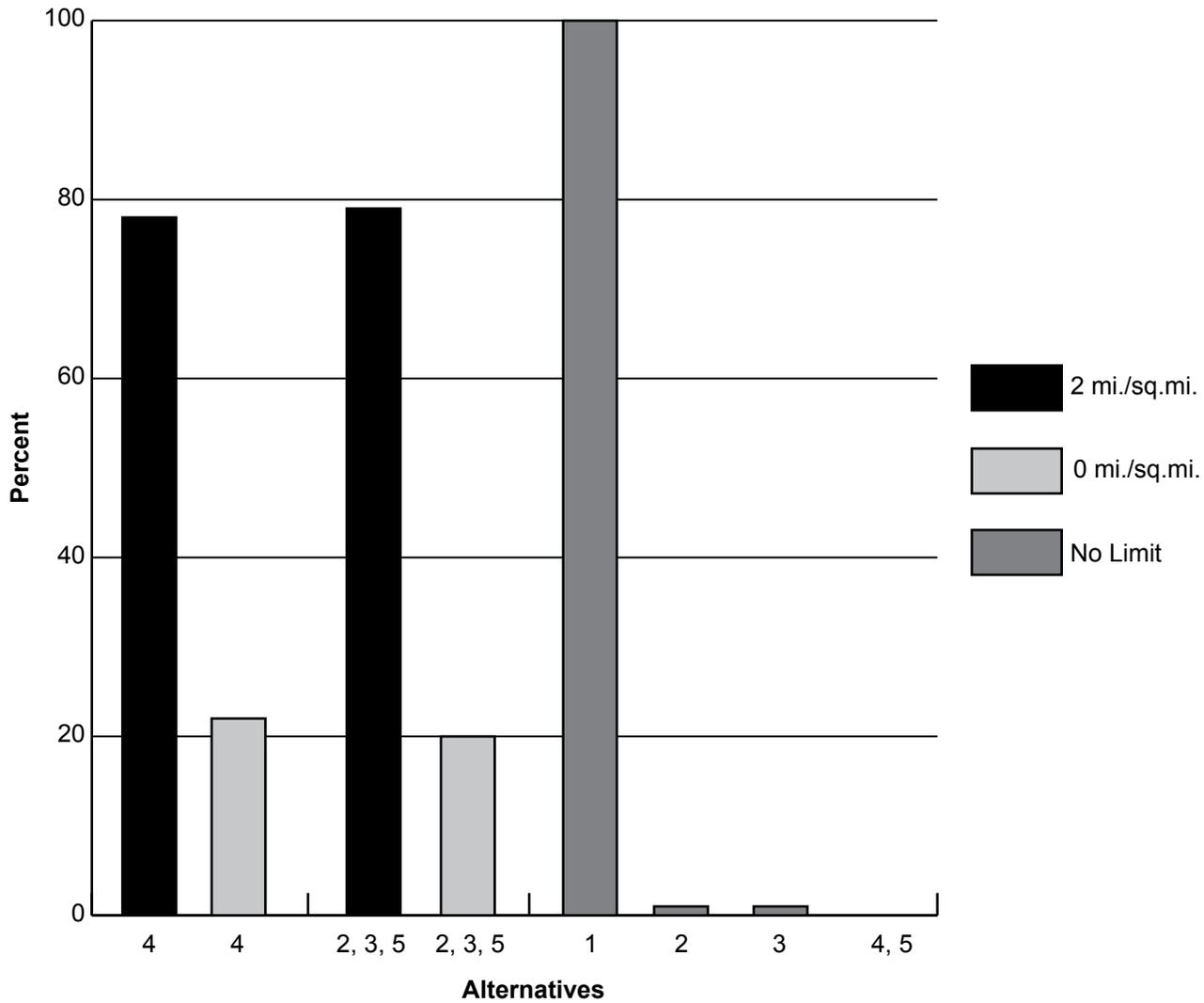


Table 4-15. Acres of Key Wildlife Habitat by Prescribed Road Density Class on BLM Lands.

Key Habitats	No Limit				0 mi./sq.mi.		2 mi./sq.mi.	
	Alt. 1	Alt. 2	Alt. 3	Alts. 4, 5	Alts. 2, 3, 5	Alt. 4	Alts. 2, 3, 5	Alt. 4
Antelope Year Round	13,709	0	0	0	58	4,538	13,651	9,171
Deer Summer Range	34,676	0	0	0	6,236	6,386	28,430	28,280
Deer Winter Range Crucial	255,038	3,971	4,569	0	63,121	72,853	186,802	177,070
Elk Summer Range	348,467	3,971	4,569	0	105,854	120,268	237,540	223,126
Elk Winter Range	209,044	2,477	2,477	0	33,412	44,638	173,122	161,896
Elk Winter Range Critical	109,887	2,477	2,477	0	2,902	9,265	104,501	98,138
Sage-grouse	58,192	0	0	0	1,300	7,360	55,192	50,832
Washington Ground Squirrel	6,332	0	0	0	0	0	6,332	6,332

**Table 4-16. Percentage of Priority Communities by Allowable Road Density Allocation on BLM Lands.**

Priority Community	Allowable Road Density				
	2 mi./sq.mi.	1.5 mi./sq.mi.	1.1 mi./sq.mi.	0 mi./sq.mi.	No Limit
Grasslands	50%	0%	0%	50%	0%
Shrublands	65%	0%	0%	34%	1%
Juniper	30%	0%	0%	70%	0%
Forest	85%	<1%	<1%	15%	0%

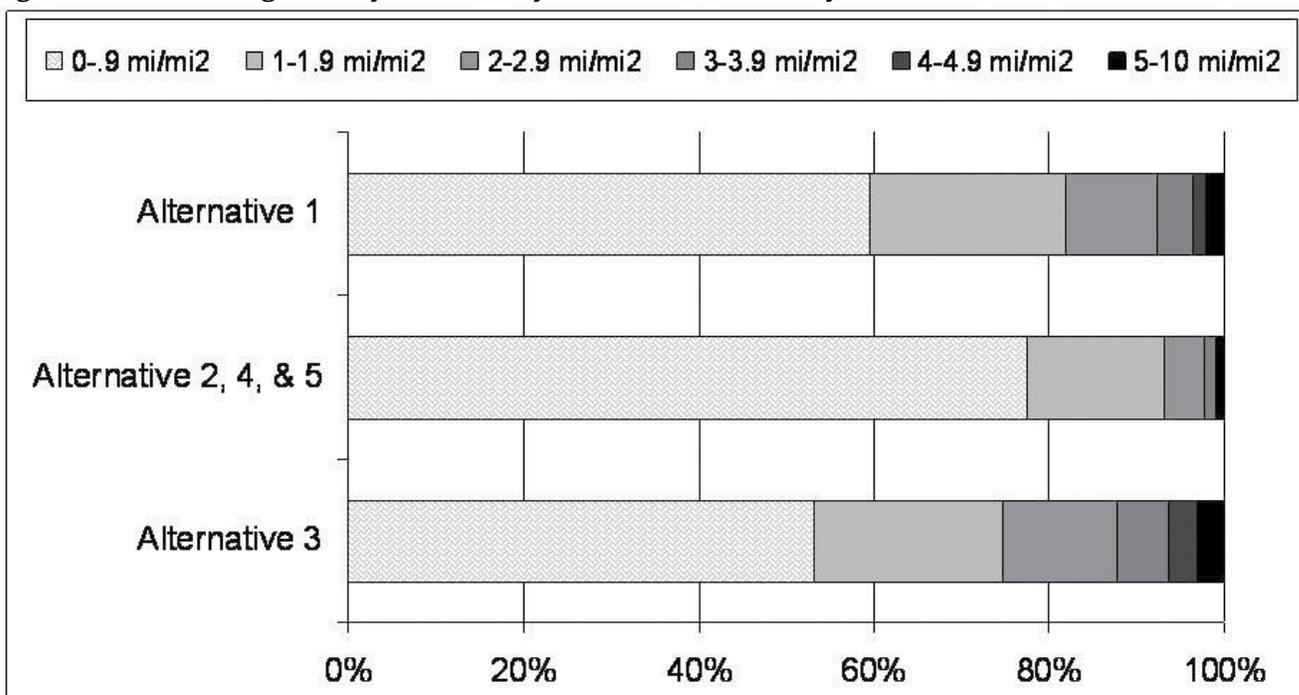
Greater direction for future transportation planning reduces the risk of road management allowing road density effects to wildlife. The majority of acres of Priority Communities and Key Wildlife habitats have no road density limit in Alternative 1, as opposed to less than one percent in the action alternatives.

### Interim Road Densities

All alternatives designate interim roads until a final Transportation Management Plan (TMP) is completed. Interim road densities may exist for five or more years. Implementation of a final transportation network depends on when a TMP can be completed and implemented. The action alternatives require that each new project meet the prescribed road densities regardless of whether a TMP is completed or not. Alternative 1 would maintain the existing transportation system, and manage projects on a case-by-case basis without constraints on road density. In the interim, the action alternatives would take a more proactive approach to transportation management and reduce effects of roads on wildlife more than Alternative 1.

Under Alternative 1, for the life of the plan, the Upper John Day Travel Management Area (TMA) would remain in the high density category, as defined by ICBEMP. Of all the alternatives, Alternative 1 has the lowest interim road density in the North Fork TMA area. Interim road densities for Alternative 2 and 3 in the Upper John Day TMA, and Alternative 3 in the North Fork John Day TMA currently exceed the prescribed road density limits, so future road closures would be necessary to meet wildlife objectives.

Road densities greater than 2 miles per square mile reduce habitat security, increase fragmentation, and increase the indirect effect of human activities. Figure 4-8 displays that the majority of BLM lands within key wildlife habitats

**Figure 4-8. Percentage of key habitats by interim road density calculated on BLM lands.**

are within the 0-1 mile per square mile category regardless of alternative. Under Alternative 1, approximately 19% of key habitats would have an interim road density of 2 miles per square mile or more (high to extremely high relative to ICBEMP categories), while Alternatives 2, 4, and 5 would have only about 8% of key habitats in this category. Alternative 3 has the highest percentage (26%) in the high to extremely high road density category.

Interim road densities by alternative and key wildlife habitat for BLM lands are displayed in Table 4-17. Alternative 1 and to a greater extent Alternative 3 have higher interim road densities than Alternatives 2, 4, and 5 in all key wildlife habitats. The effects of the higher interim road densities in Alternatives 1 and 3 are most pronounced in elk summer, deer and elk winter range, and Washington ground squirrel habitat.

Bate and Wisdom (2002) found that areas near roads (both open and closed) had significantly fewer snags than areas further from roads in forests of northeastern Oregon. This was particularly true if the areas were close to towns. The BLM lands in the Upper John Day and South Fork TMAs have the closest proximity to towns, while the Rudio and North Fork TMAs are the furthest. Based on the relative abundance of forest habitat and allowable road densities between Travel Management Areas (Table 4-14), habitat for wildlife species in the forest Priority Community (Appendix O) would risk losing snag habitat in the Upper John Day TMA and to a lesser extent the South Fork area under Alternatives 1 and 3.

In Alternative 1, the North Fork is the only forested area that would not fit in the moderate to high road density category based on open interim roads. The majority of forested communities in Alternative 3 are in the high

**Table 4-17. Acres of Key Habitats by Interim Road Density Category and Alternative on BLM Lands.**

Key Habitat	Alternative	Interim Road Density (mi./sq.mi.)					
		0-0.9	1-1.9	2-2.9	3-3.9	4-4.9	5-10
Antelope Year Round	1	9,587	3,227	331	520	5	40
	2, 4, 5	13,010	592	108	0	0	0
	3	9,615	3,227	303	520	5	40
Deer Summer Range	1	15,120	6,414	3,869	2,631	1,862	4,780
	2, 4, 5	25,743	2,415	3,735	1,308	243	1,233
	3	13,256	6,152	3,871	3,890	2,885	4,624
Deer Winter Range Crucial	1	154,683	56,550	26,681	11,255	3,317	2,553
	2, 4, 5	194,303	42,513	12,882	3,415	988	937
	3	136,354	54,700	35,789	14,799	7,593	5,803
Elk Summer Range	1	209,345	74,379	34,381	16,254	5,443	8,665
	2, 4, 5	275,387	50,388	14,166	4,342	1,474	2,710
	3	195,892	72,535	38,720	18,540	10,518	12,262
Elk Winter Range	1	130,481	48,959	19,398	5,821	1,738	2,647
	2, 4, 5	161,266	34,907	8,869	2,079	752	1,172
	3	106,562	44,838	29,184	12,702	9,089	6,668
Elk Winter Range Critical	1	60,971	29,907	11,697	4,322	955	2,035
	2, 4, 5	80,750	21,348	5,579	1,087	322	801
	3	52,195	28,327	17,201	7,274	2,597	2,292
Sage-grouse	1	32,923	12,752	8,204	2,508	809	996
	2, 4, 5	46,388	9,387	1,802	282	283	50
	3	34,114	13,557	7,552	1,203	770	996
Washington Ground Squirrel	1	2,377	641	1,992	1,041	0	278
	2, 4, 5	5,574	517	0	0	159	80
	3	2,377	641	1,992	1,041	0	278

interim road density category. Alternatives 2, 4, and 5 have interim road densities in the low to moderate range, except in the Upper John Day TMA.

Roads not designated as interim would in general not have physical closures on them, and thus would likely continue to receive some level of use. Havlick (1995) reviewed 802 road closure sites. Of these, 73% were not fully closed as intended due to lack of compliance. It is impossible to quantify the level of compliance expected under this RMP, but assuming there would be an equal level of compliance among alternatives, the loss of wildlife habitat and snags would be less in Alternative 2, 4, and 5 than in Alternatives 1 and 3.

Alternative 3 would have the highest open road densities in the interim of all of the alternatives.

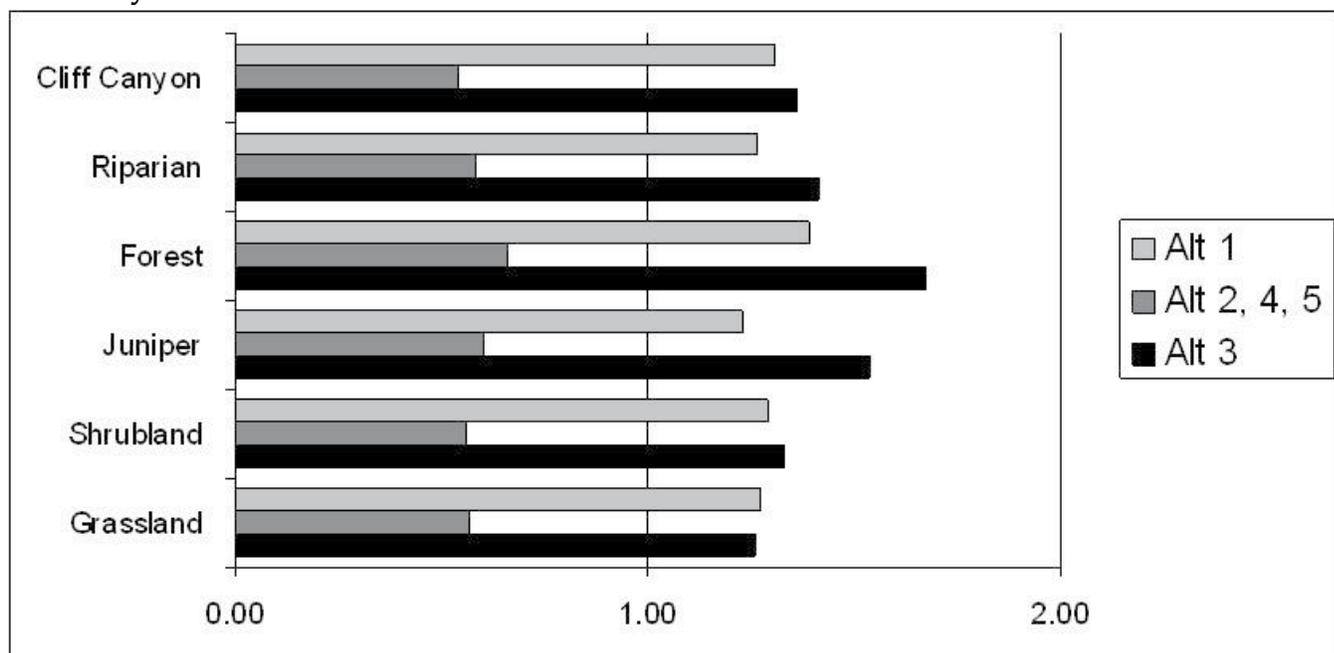
Both the North Fork and Upper John Day Travel Management Areas would be in the high category with the remaining areas in moderate for BLM lands. The North Fork area includes important habitat for several species including Lewis' woodpecker. The proposal to open numerous roads that are currently closed in the North Fork area would reduce surrounding wildlife habitat quality and quantity, including snag densities (Bate 2002).

Interim road densities are generally less than 2 miles per square mile under all alternatives and on all Priority Communities, except riparian and forest (Figure 4-9). Alternative 1, and to a slightly greater extent Alternative 3, have higher road densities (moderate category) than Alternatives 2, 4, and 5 (low category) in all Priority Communities, especially forest and juniper.

### Cumulative Road Density

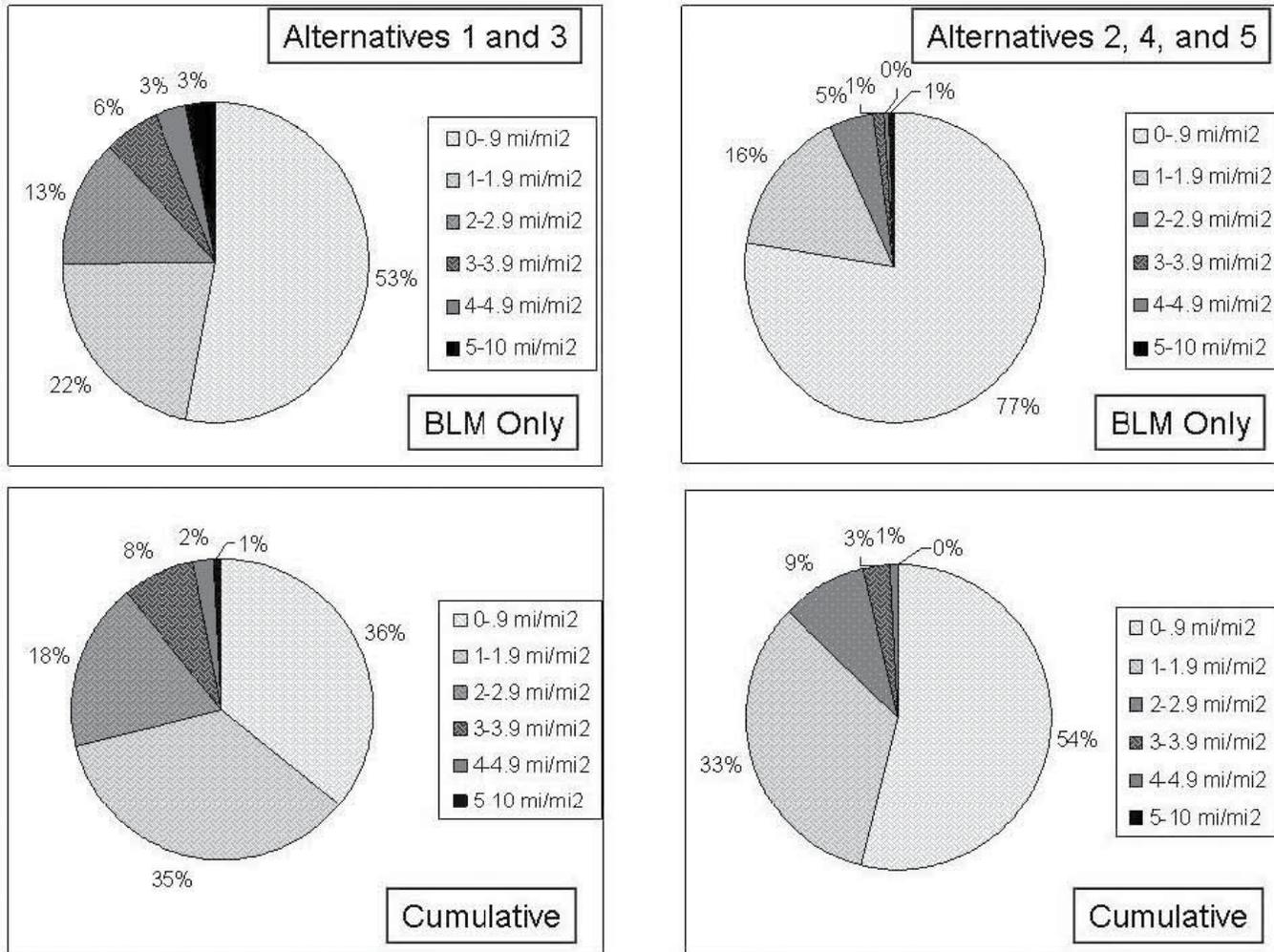
The BLM has no control over the management of roads on surrounding lands; however, the existence and use of these roads have effects on wildlife and their habitats on and off BLM lands. The interim road densities vary by alternative relative to cumulative road densities. Figure 4-10 shows the type and magnitude of differences between alternatives in road density on BLM versus all land ownerships surrounding BLM. These data also show the BLM's ability to influence road related effects. Figure 4-10 shows that on BLM lands under Alternatives 1 and 3, there would be 53% of key wildlife habitat in the zero to 0.9 mile per square mile category (very low to moderate) and 25% would have road densities greater than 2 miles per square mile (high to extremely high). Alternatives 2, 4, or 5, would have 77% and 7% of key habitat, respectively, in the zero to 0.9 mile per square mile and more than 2 miles per square mile categories.

**Figure 4-9. Approximate average road density by alternative within Priority Communities BLM only.\***



\*The numbers in this figure represent averages based on the estimated percent composition of each Priority Community by area in each road density category.

**Figure 4-10. Percentage of key habitats by road density category calculated on BLM lands only versus cumulatively (all roads within 1 mile of BLM).**



All alternatives would result in greater percentages of habitat in the higher road density categories for cumulative road densities than interim densities based solely on BLM roads (Figure 4-10). This is most pronounced in deer summer range, sage-grouse habitat, and elk winter crucial range. The influence of surrounding roads is more significant in Alternative 1 and 3 due to the higher level of interim open roads in these alternatives. Under Alternatives 1 or 3, there would be 36% of key wildlife habitat that would have a cumulative road density of zero to 0.9 mile per square mile category (very low to moderate) and 29% that would have cumulative road density greater than 2 miles per square mile (high to extremely high). Alternatives 2, 4, or 5 would have 54% and 13% of key habitat, respectively, in these categories.

### Habitat Security

The majority of studies of road-related effects have been associated with big game. Lyon (1983) found that in general security habitat became more effective the farther it was from an open road. Some of the more recent studies have found that road density in and of itself may not be the best measure of habitat effectiveness for elk. Rowland *et al.* (2000) found that there was no significant relation between number of elk locations and habitat effectiveness modeling based on road densities. Habitat effectiveness models attempt to predict the percentage of available habitat that is usable by elk outside the hunting season. They proposed the use of a road banding method (see Data, Methods and Models in the introduction to this chapter) to better predict habitat reduction based on roads. Figure 4-11 displays the amount of all key wildlife habitats within the given distance (band) from an open road, and Figure 4-12 shows the amount of each key habitat within a given distance from an open road. Values in Figure 4-11 and 4-12 reflect all roads, not just BLM roads. Bands are often numbered, with band 1 being the closest to a road (zero to 394 yards); Bands 2, 3, 4, 5, and 6 occur at 395 to 788 yards; 789 to 1,182 yards; 1,183 to 1,576 yards; 1,577 to 1,970 yards; and 1,971 to 2,364 yards, respectively.

Adverse effects to wildlife and their habitat are generally greater closer to an open road. Figures 4-11 and 4-12 represent the varying level of effects from darker color (394 yards from an open road) having the least habitat security to lighter color (>2,364 yards from an open road) have the most habitat security. While there are differing levels of habitat security in each band, Rowland (2005) found that for elk, habitat use increased at 1,182 yards or more from roads.

All key habitats have higher percentages of secure habitat in Alternatives 2, 4, and 5 than would exist under Alternatives 1 and 3. This is particularly true in antelope year round and Washington ground squirrel habitats. The potential for shooting of ground squirrels from open roads is a threat to small populations like the Washington ground squirrel.

In Alternatives 1 and 3, the majority of grassland, shrubland, and juniper Priority Communities are within the first two bands (0-788 yards from an open road). For forest and riparian communities, the majority is within the first band. The exception is in the North Fork area where Alternative 1 retains most of the forest and shrublands in bands 2-4 with approximately 40% of the area greater than 1,182 yards from an open road. Alternatives 2, 4, and 5 increase the amount of forest habitat within bands 2 and 3 and increase the amount of area in band 4+ to approximately 30% for the grassland and shrubland communities. Riparian communities remain primarily within the first band with some localized reductions.

As Figures 4-11 and 4-12 illustrate, 79 to 96% of key habitats would be within the first three bands (< 1,182 yards) in Alternatives 1 and 3, versus 67 to 94% in Alternatives 2, 4, and 5. The greatest difference is in the number of acres in bands 1 and 2 with Alternatives 1 and 3 averaging near 80% and Alternatives 2, 4, and 5 averaging near 60%.

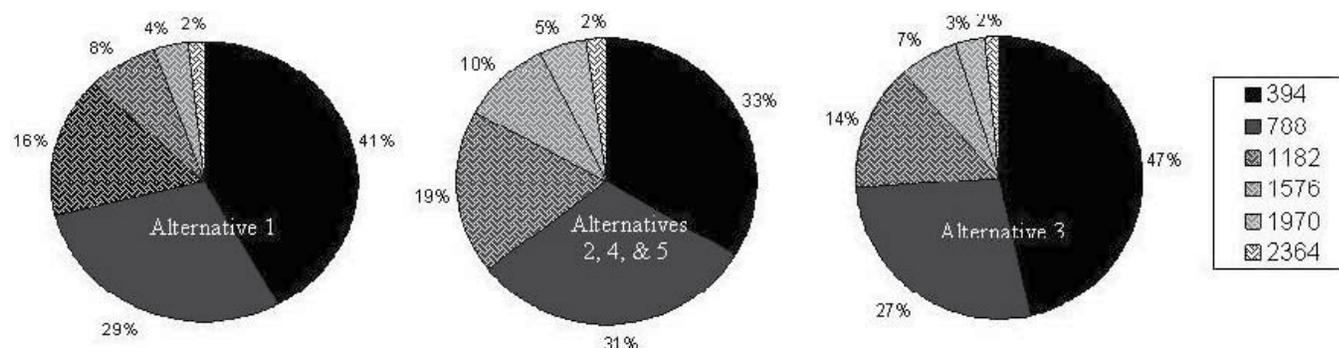
### Seasonal Restrictions

Winter is a trying time for most wildlife; the most studied and noted being big game. Disturbance on wintering habitats can cause animals to utilize critical energy reserves and avoid foraging areas with the highest quality forage. Alternative 1 currently provides seasonal road closures on 86,793 acres. The action alternatives propose seasonal closures on slightly more than 331,000 acres, or almost four times the amount of area than under Alternative 1. Within these seasonal closures, there are roads that remain open year-round (State and County roads, see Maps 12A-F and 13A-F).

Figure 4-13 shows the amount of area expected to provide security habitat (> 1,182 yards from an open road) during the critical closure period. Areas within a seasonal closure may still be within 1,182 yards of an open road due to being on the edge of the closure area or adjacent to a year-round open road within the seasonal closure (seasonally closed with reduced security habitat).

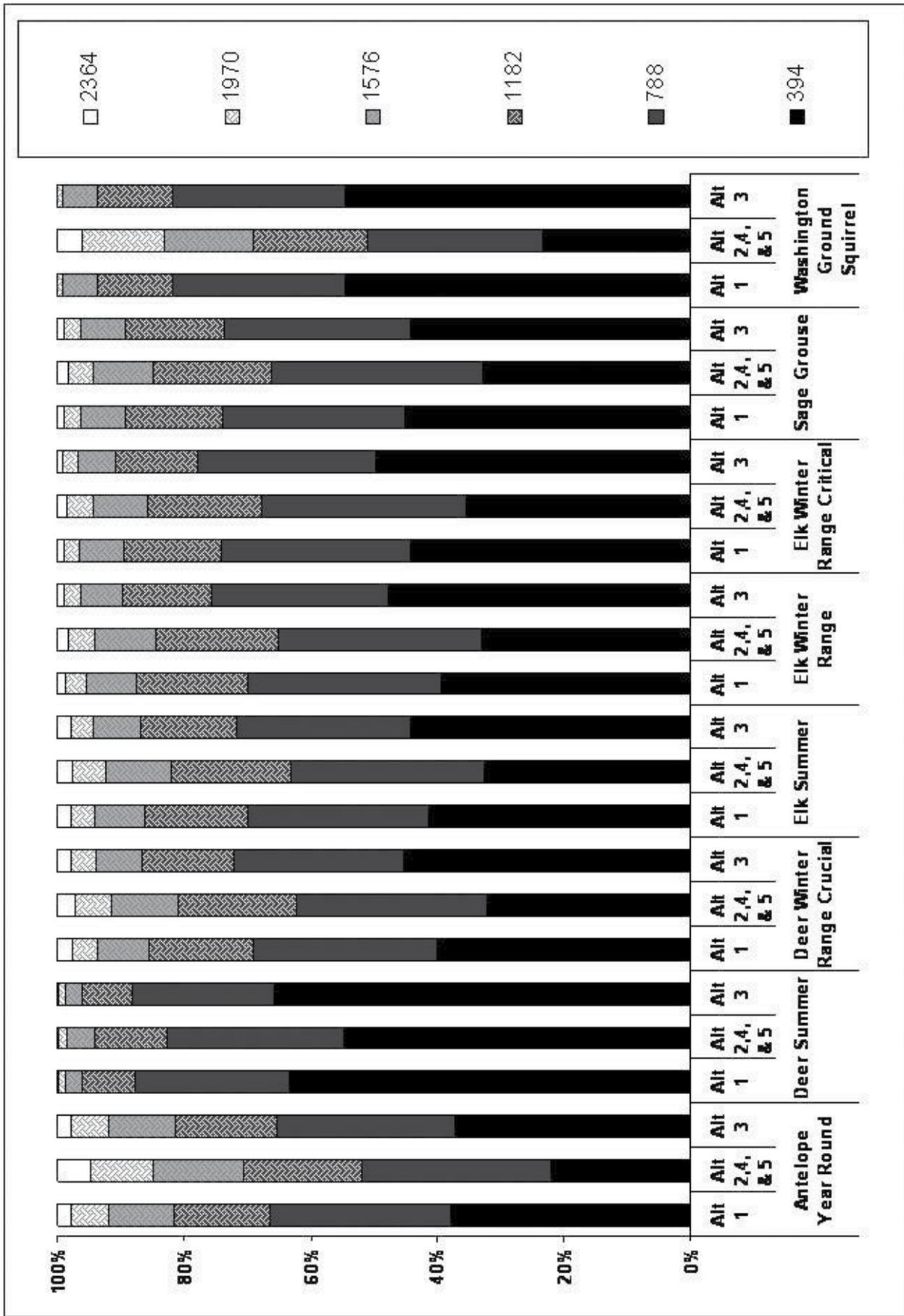
The depicted amount of seasonally closed area with reduced habitat security is higher than what would actually occur on the ground for the following reasons: (1) many of the roads considered open for this analysis are on adjacent lands and the public would have no access to them, and (2) some roads accessed through Forest Service lands would be snowed out at higher elevations (most years) or seasonally closed by the Forest Service. Optional closures under current management (Alternative 1) have not been utilized over the last 20 years and would not likely be implemented in the future.

**Figure 4-11. Percentage of key wildlife habitats on BLM lands by road band (yards).\***



\*Because security habitat is affected irrespective of road ownership, all open roads in the plan area were used for this analysis.

Figure 4-12. Percentage of key wildlife habitats on BLM lands by road band (yards) and alternative.\*



\*Because security habitat is affected irrespective of road ownership, all open roads in the plan area were used for this analysis.

Figure 4-13 illustrates that the action alternatives would provide far greater amounts and distribution of secure habitat during the winter than Alternative 1. Alternative 3 differs from Alternatives 2 by about 600 acres, and Alternatives 2 and 3 differ from Alternatives 4 and 5 by approximately 5,000 acres in areas designated as Open to OHVs that would not be seasonally closed.

### **Sutton Mountain Back Country Byway Effects on Wildlife**

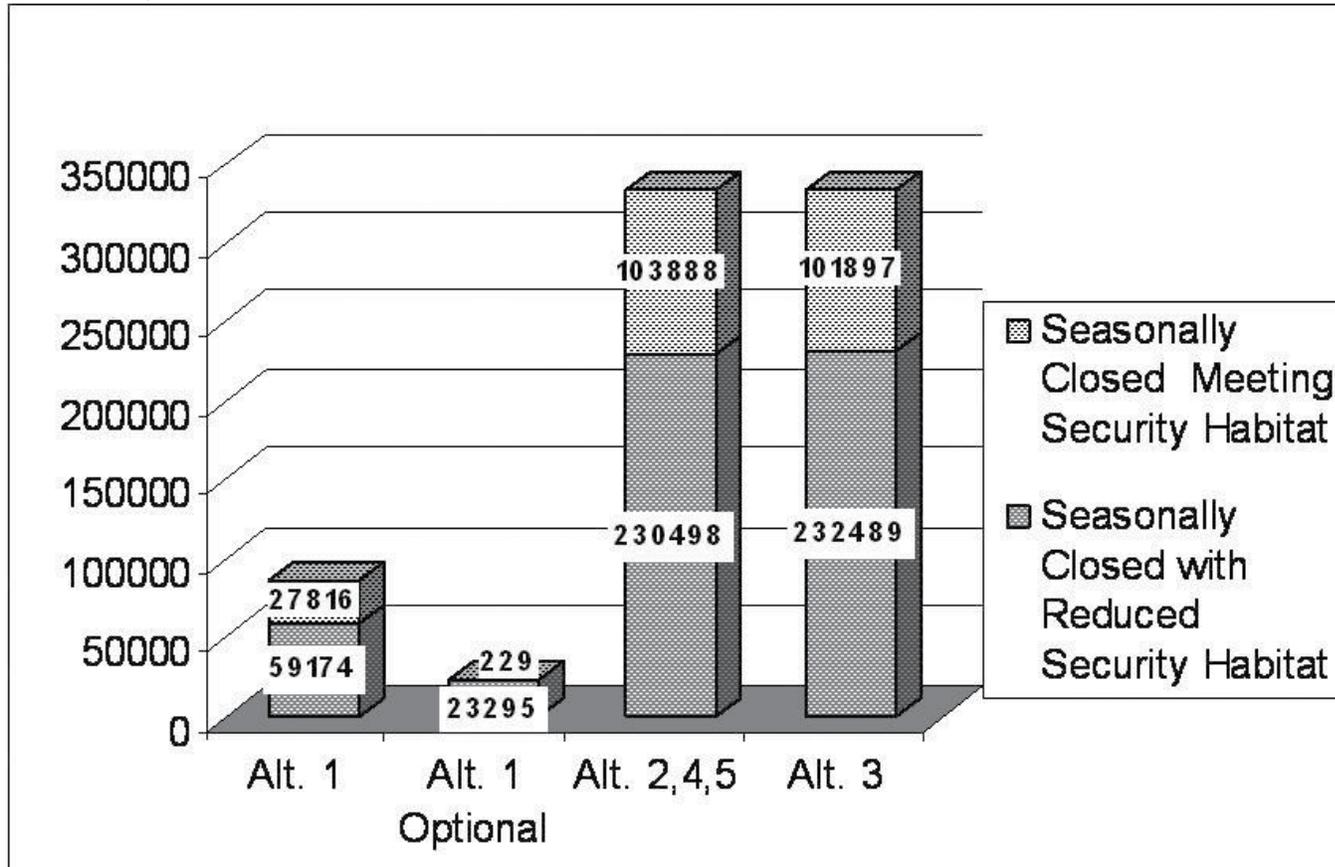
Alternative 1 does not propose creation of a back country byway around Sutton Mountain or elsewhere so use levels on the Burnt Ranch road would continue at existing levels. The action alternatives propose a back country byway around Sutton Mountain. It is hard to estimate exactly how much of an increase in road use would occur as a result of this designation, but it can be assumed that road use would increase especially during the summer tourism months.

Both deer and elk move across this road extensively throughout the year. The increased use under Alternatives 2–5 would not create a movement barrier but might increase stress and potential for collisions more than Alternative 1.

### **Class II Rock Crawling Area Effects on Wildlife**

Alternative 1 does not propose a class II rock crawling area; however, much of the plan area is open to off road vehicle travel, so the demand for this activity would likely continue. The use would be dispersed across the landscape and continue to be unmanaged by the BLM. The action alternatives would designate trails, which would likely increase the use in the designated area. Under the action alternatives, signing and designation may increase authorized and unauthorized use across the plan area. The risk of disturbing wildlife would be high near designated trails but wildlife disturbance would be isolated to a specified location, and if use is directed to these areas the level of use across the rest of the plan area would be reduced.

**Figure 4-13. Acres of security and reduced security habitat on BLM lands within seasonal closures by alternative.\***



\*Because security habitat is affected irrespective of ownership of the road, all open roads in the plan area were used for this analysis.

**OHV Designation Effects on Wildlife**

The primary effect on wildlife of OHV use is related to disturbance. Habitat destruction is usually localized with the exception of the spread of noxious weeds. The greater amount of off-road use permitted, the greater the potential spread of noxious weeds and habitat destruction. Limiting OHV use to designated roads reduces the risk of nest destruction for ground-nesting species, reduces the risk of noxious weed spread, increases habitat security, and limits the extent of habitat that can be accessed in all priority communities.

In their 2009 position paper, ODFW recommended that OHVs not be allowed for use in game retrieval of hunter-harvested big game animals. All action alternatives would preclude this use in Limited and Closed designations; see the discussion of effects of OHV designations in this section for more detailed effects discussion of Open OHV designations by alternative.

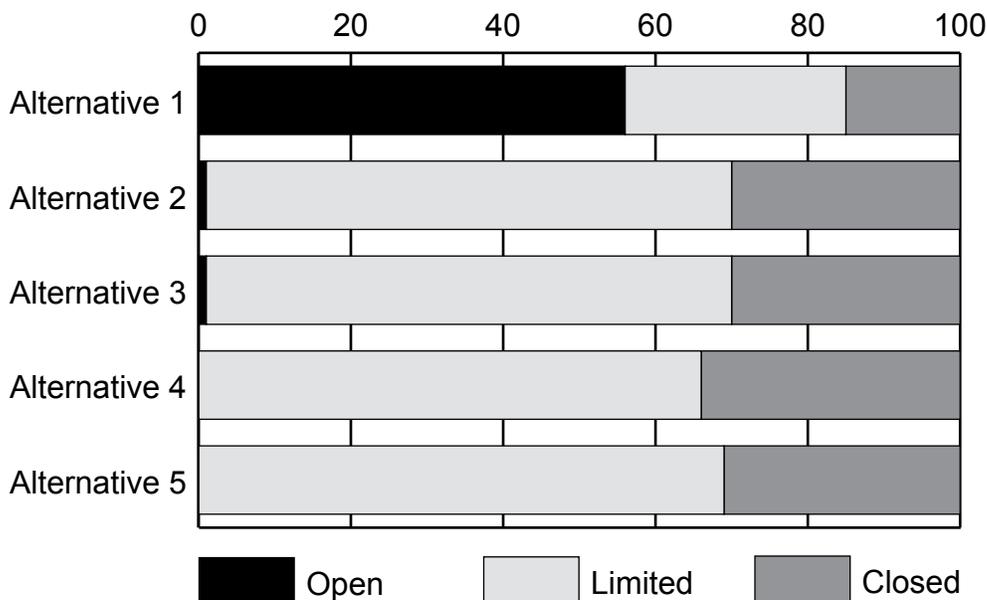
“Almost without exception, analyses of the data reveal that Off Road Vehicle (ORV) use has significant negative impacts and can reduce numbers, diversity and biomass of vertebrates” (Berry 1980, p. 451).

Figure 4-14 graphically depicts the difference between alternatives by OHV allocation. Figure 4-14 shows that the action alternatives significantly reduce the amount of area where off-road vehicle use is permitted, thus increasing habitat security. The amount of area designated as Limited triples in the action alternatives. This would help isolate impacts of vehicles to defined area and allow for greater habitat security in the remaining areas. There is also a slight increase in the amount of area closed to motorized vehicle use in the action alternatives. In general, the action alternatives reduce the amount of Open designation while increasing the amount of Limited and to a lesser extent Closed designations.

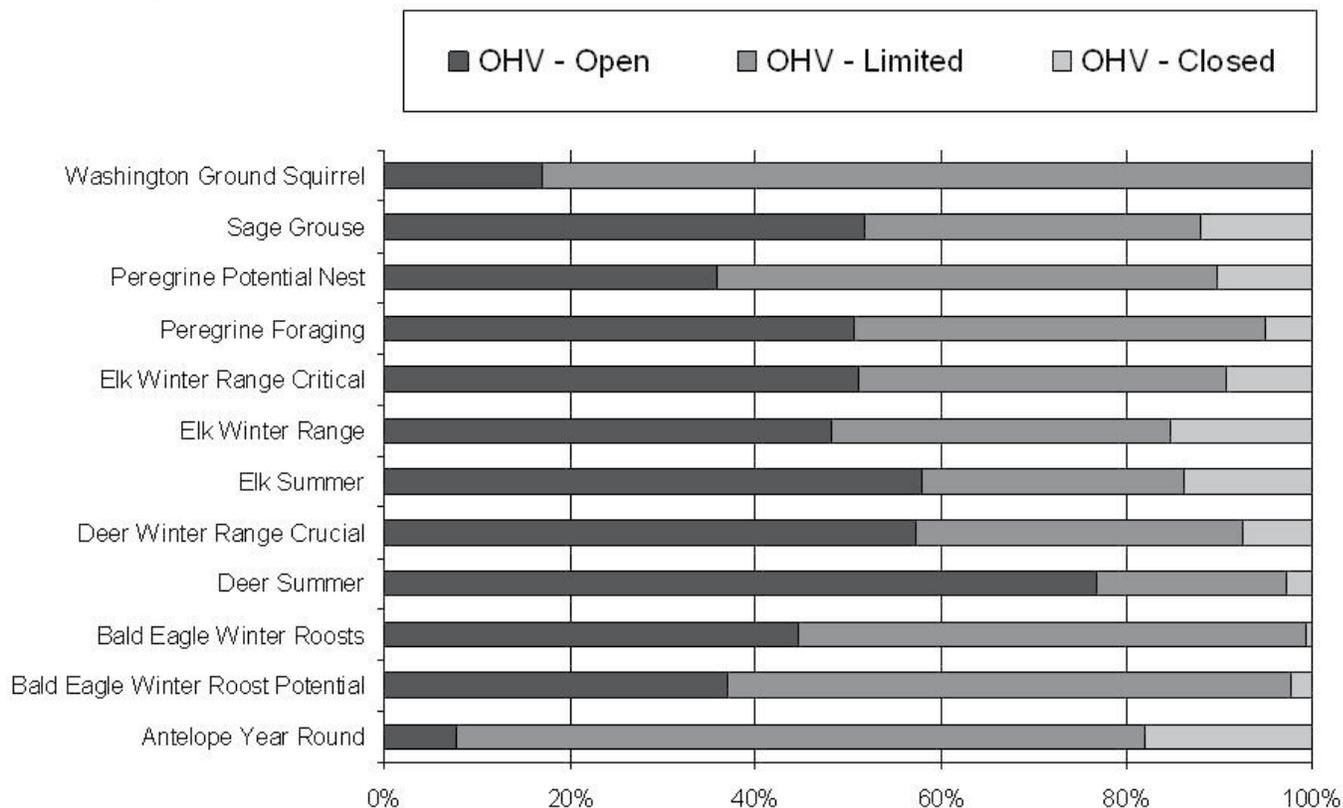
Figure 4-15 (Alternative 1) and Figure 4-16 (the action alternatives) display the amount of area in each OHV designation by key wildlife habitat. Alternative 1 would continue existing levels of OHV disturbance, habitat destruction of key wildlife habitats, and spread of noxious weeds. The action alternatives would reduce these effects commensurate with changing 90% of the area from open to limited to off-road vehicle use.

Wildlife disturbance from OHVs on wintering habitats can increase an animal’s energy expenditure and result in mortality. The OHV use in the spring on grassland and shrubland habitats has the potential to destroy nests of ground-nesting birds such as sage sparrow and sage-grouse. As Figure 4-15 shows, Alternative 1 would allow off-road travel on approximately 50% of most key wildlife habitats. In the action alternatives, the OHV Open areas encompass less than 2% of each of the following key wildlife habitats: elk winter critical, elk winter, elk summer, and deer winter crucial.

**Figure 4-14. Percentages of BLM lands designated as Open, Limited, and Closed to OHV use by alternative.**



**Figure 4-15. Alternative 1—Percentage of key wildlife habitats on BLM lands by OHV designation.**



Under Alternative 2, triggers on Rudio Mountain that would determine when the designation would need to be shifted from Open to Limited for resource concerns would prevent sensitive species from becoming listed and ensure OHV disturbance of elk does not cause an “undesirable” distribution in their winter use patterns as a result of the Open OHV designation. If a Limited to designated routes OHV designation is triggered, it would reduce the risk of nest destruction for ground nesting species, reduce the risk of noxious weed spread, increase habitat security, and limit the extent of habitat that can be accessed in the shrub and forest Priority Community.

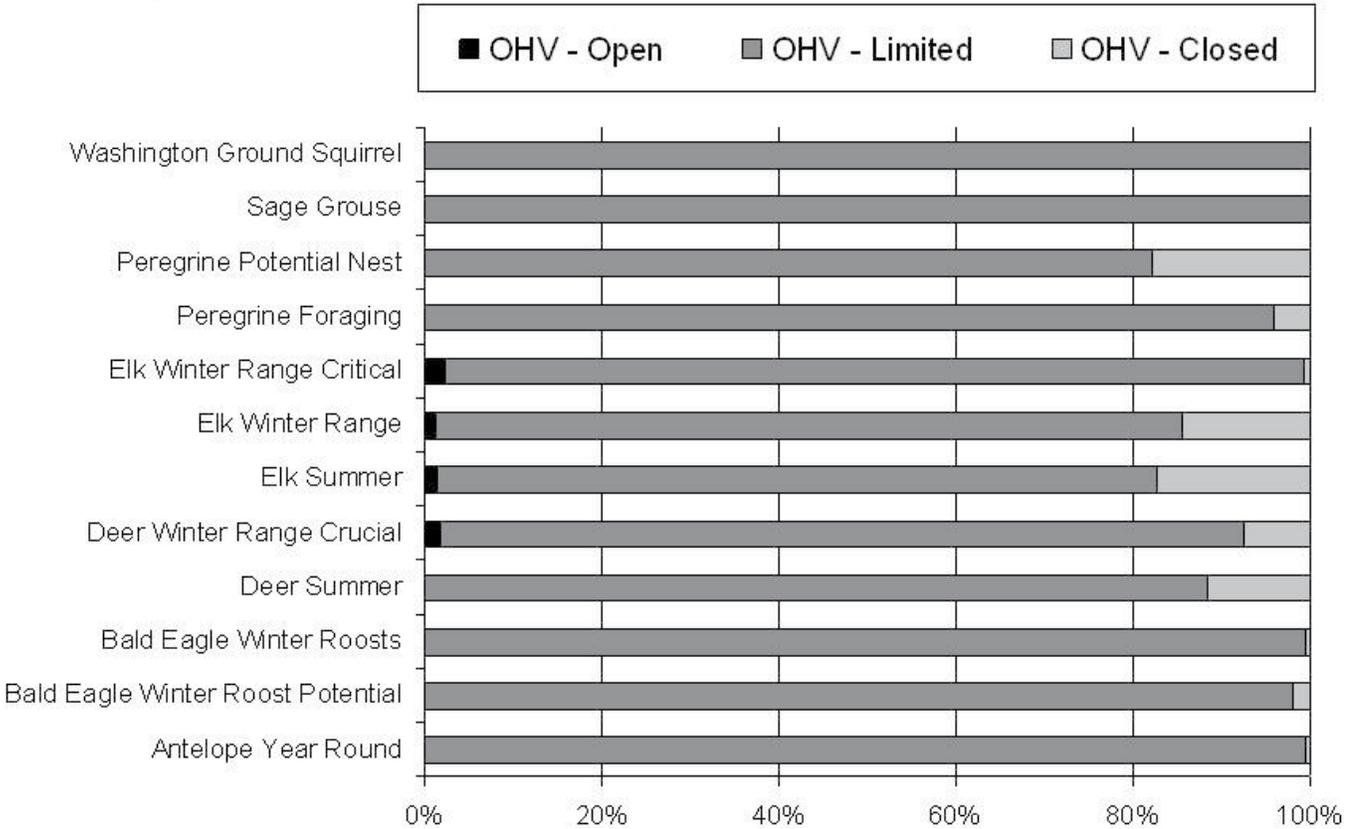
### ***Priority Communities***

In Alternative 1, Open OHV areas are dispersed across all Priority Communities. In Alternatives 2 and 3, Open OHV areas are in the shrubland community and adjacent to forest. The Open OHV area on Rudio Mountain is used extensively by a herd of antelope and is within 0.75 mile of a golden eagle nest. The golden eagle nest is outside of any noise disturbance range. Depending on OHV use levels, the antelope herd would likely be displaced for portions of the day or year. Alternative 3 would have one additional Open OHV area approximately 600 acres in size in a shrub community outside of Mitchell. Alternatives 4 and 5 would designate approximately 4,567 less acres Open OHV area than Alternatives 2 and 3.

Sound from human activities, such as OHV use, can alter wildlife behavior and habitat use. Wildlife can also abandon favored habitat in response to sound disturbances, or incur energy expenses by reacting repeatedly when they cannot escape. Adversive levels of sound might cause wild animals to become irritable, affecting feed intake, social interactions, or parenting. All these effects might eventually result in population declines (Knight and Gutzwiller 1995). However, the type and amount of impact is highly variable based on the species, human activity associated with the habitat, and frequency, intensity, and randomness of the noise. In some cases, animals often learn to ignore disturbances that are not directed at them, and most animals seem to tolerate disturbance better in woodland than in open terrain (Knight and Gutzwiller 1995).

The majority of the approximately 3,000-acre Little Canyon Mountain SRMA is adjacent to Canyon City, state highway, or county roads. Because of its proximity to urban areas such as housing; highways; airports; and

**Figure 4-16. Alternatives 2, 3, 4\* and 5\* – Percentage of key wildlife habitats on BLM lands by OHV designation**



\* Alternatives 2, 3, 4, and 5 varied by less than 5,000 acres, so the results of 2 and 3 are displayed here. The primary difference is that open acres in Alternatives 2 and 3 are closed, and in Alternatives 4 and 5 are Limited, with the exception of 2 acres in deer summer range.

extensive historic and current activity including mining, logging, hunting, and OHV use, many wildlife species have altered or eliminated their use of the area. This is particularly true of the northern portion of the SRMA near the county road and residences.

Species of wildlife continuing to use the area have adapted to human presence. It is expected that species that more readily habituate to human activity such as coyote, skunk, and deer avoid areas where chance encounters are most likely, but continue to utilize the general area. Habituation in this case is defined as the waning of an animal's innate response to repeated exposure to stimuli that carry no discernible biological consequence.

Although species such as bear, elk, and antelope appear to be more sensitive to human activity they too have been documented to become habituated to human activity. Between 2002 and 2004, Preisler, Ager, and Wisdom studied elk disturbance associated with various forms of recreational activity. Elk were selected partially because they are a species that can be sensitive to human disturbance. This study found less travel time during disturbances in 2004 compared to 2003, suggesting that elk became habituated to these recreational activities.

“It appears that elk in this study perceived roads or trails as the location of a predictable source of human disturbance” (Preisler, Ager, Wisdom, 2006).

Habitat avoidance is expected for species sensitive to human disturbance in areas of high human activity as well as areas with higher rates of chance encounters. Chance encounters are most likely in areas of unregulated use where human use patterns are not confined to specific locations or times. Energy expenditures are greatest during disturbance. Predictable sources of human disturbance allow wildlife to reduce these energy expenditures by avoiding high encounter areas. Unregulated OHV use increases the amount of area where chance encounters can occur and decreases habitat quality.

Alternative 1 allows OHV use across the area with no restrictions on the timing, intensity, or location of use. This uncontrolled use increases the amount of chance encounters and reduces the potential use of the area by habituated individuals and increases the potential for destruction of habitat elements such as down logs and shrubs.

The action alternatives would direct recreational use to specific areas and times, which would limit the amount of area impacted and make it much easier for animals to habituate. Although Alternatives 2, 3, and 4 vary the class of OHV, time of day restrictions, and days of the week, the areas where OHV use is allowed would only vary by two acres associated with the North Pit which is within 0.25 mile of the county road. It is not expected that there would be a measurable difference in wildlife habitat use between Alternatives 2, 3, and 4. Removal of all OHV use in Alternative 5 is expected to reduce the amount of vehicle use in the SRMA; however, due to the county road, state highway, Forest Service access road, and the expected number of rights-of-way for mining claims and residences, there is still expected to be significant amounts of human activity including motorized use in this area. Human use levels under Alternative 5 are not expected to be significantly reduced enough to alter habitat use or species presence significant enough to alter broader population levels or distribution patterns.

The Little Canyon Mountain area is not currently identified as part of a reproductive home range for any Threatened, Endangered, or Sensitive species. The noise levels from prescribed OHV use under any of the alternatives do not combine with disturbance from adjacent communities to have a measurable impact on Threatened, Endangered, or Sensitive wildlife species.

There are no significant wildlife habitats or populations that would cause an Open OHV designation in the North or South pit of Little Canyon Mountain to be in violation of Executive Orders 11644 (Use of Off-Road Vehicles on Public Lands, February 8, 1972), 11989 (Off-Road Vehicles on Public Lands, May 24, 1977), and CFR 8342.1.

### **Summary of Travel Management and OHV Effects on Wildlife**

Alternative 1 would have the greatest levels of disturbance to wildlife from noise, greatest loss of wildlife forage, and greatest loss of quality wildlife habitat. This would be due to the higher interim road densities, lower amounts of area closed seasonally, the lack of upper road density or specific direction for road locations as they relate to wildlife habitats, and the high amount of OHV Open designation. These effects vary extensively across all key habitats and Priority Communities.

Alternative 3 would have the next greatest level of disturbance to wildlife from noise, greatest loss of wildlife forage, and greatest loss of quality wildlife habitat. This is particularly true in the North Fork area. Opening existing road closures in the North Fork area would increase the potential disturbance to big game (including bighorn sheep) and increase the potential for snag habitat lost to wood cutting in a key habitat area for Lewis' woodpecker. Alternative 3 would also have the highest Open OHV designation of all of the action alternatives, including approximately 600 acres outside of Mitchell that once supported a large wintering population of deer.

Alternative 4 has the least impact to wildlife and wildlife habitats. The interim road designations in Alternatives 2, 4, and 5 are basically the same. Alternatives 4 and 5 have approximately 4,500 acres less in Open OHV designation than Alternative 3 and approximately 4,000 acres less than Alternative 2.

### **Other Direction That Would Influence Travel Management Effects on Wildlife Cover**

Vegetative cover adjacent to roads can reduce the effects of the road for some species and increase habitat security. For example:

- Unsworth *et al.* (1998) found that elk in areas with roads used habitats with greater canopy cover.
- In the winter, elk in unroaded habitats increase use of open forest types. Roads through forage areas could reduce elk use of open forest by up to 90% for 500 meters when hiding cover is unavailable (Lyon 1980, cited in Buckmaster 1999).
- When roadside hiding cover is present, the road's zone of influence may be reduced to approximately 100 meters (Buckmaster 1999).

All alternatives provide direction for the retention of cover; however, the action alternatives include guidance to specifically target cover retention within 550 yards of open roads. The action alternatives have higher amounts

of land designated as Wildland Urban Interface (WUI). Areas within WUI and adjacent to primary roads would likely have reduced cover quantities directly adjacent to the roads to meet public safety requirements. Cover adjacent to those roads may be less in the action alternatives than Alternative 1.

### **Road Placement and Road Closure Prioritization Criteria**

Alternative 1 would not provide substantive direction for road location or prioritization for closure of roads to avoid important wildlife habitats. The action alternatives provide direction to avoid placement of new roads and to close existing roads in or within the influence of secure habitat (1,182 yards) and riparian communities, as well as numerous Best Management Practices (BMPs) (Appendix B).

The level of risk to special status species or habitat is generally the same for Alternatives 2, 4, and 5 with the effects slightly reducing, respectively. Alternative 3 also has a more extensive interim road network on the North Fork area. Many of the roads in Alternatives 2, 4, and 5 that were not identified as interim routes were excluded because they were in or adjacent to key wildlife habitats. Therefore, Alternative 3 has higher potential for impacts to the Lewis' woodpecker, bald eagle, peregrine falcon, and Columbia spotted frog than all other action alternatives. Alternative 1 would have the greatest risk of impacting special status species because new routes could be user-created across the vast areas with Open OHV designation. All alternatives would require changes to travel management if special status species or habitats were identified as being significantly impacted by the travel management system.

### **Recreation Effects on Wildlife**

The effects of OHV designations are addressed earlier in the transportation effects section. The discussion below summarizes the effects of developed recreation sites.

Generally, developed recreation is intended to reallocate dispersed recreation use to defined sites. All alternatives propose construction of a developed recreation site on the South Fork if negative effects of dispersed recreational use in this area become too great. Recreational development on the South Fork would occur across eight acres including each of the following habitat types: sage-grouse habitat, critical elk winter range, elk summer range, bald eagle winter roosting area, and deer crucial winter range. The action alternatives propose construction of two developed recreation sites on the North Fork. These sites would be located across 28 acres including each of the following habitat types: bald eagle winter roosting area, deer crucial winter range, elk winter range, and elk summer range.

Alternative 1 would have the least wildlife habitat loss and fragmentation from recreational development because the facilities on the North Fork would not be constructed. However, higher levels of dispersed use would occur across the area. If the South Fork campground were constructed, the campground location would be adjacent to the South Fork road which is a major road; hence, habitat loss and fragmentation have already occurred. The effect of losing eight acres of habitat is less than the potential effects of increased use in the area due to the development. Risks include wildlife disturbance, increased vehicle-wildlife collisions on the South Fork road, and increased noxious weed spread. Alternative 1 would not cause a trend toward federal listing of any of the special status species.

The action alternatives would have the greatest recreation development impact due to the creation of developed sites on the South Fork and North Fork. Impacts common to all alternatives are described in Alternative 1. The creation of two developed campgrounds along the North Fork would increase the number of summer and fall hunting season user days. The seasonal closure of campgrounds would protect bald eagle winter roosting and big game winter ranges. The majority of recreational use would be expected along the river increasing disturbance to waterfowl. During the summer, there is extensive summer range for deer and elk higher in the watershed and on adjacent Forest Service lands. Therefore, BLM recreation management would not limit deer and elk habitat.

### **Land Tenure Effects on Wildlife**

Under all alternatives, land tenure classifications would generally not directly affect species and habitats. However, the actual land exchanges, acquisitions, and disposals would add or remove habitat from BLM jurisdiction. Wildlife guidelines in all action alternatives call for retaining high value wildlife habitats or exchanging them for lands with similar or greater value. There is the potential that other resource values would benefit at the expense

of wildlife habitat values. It is impossible to predict how much of this may occur: effects to wildlife would be evaluated during implementation on a site-specific basis. The only applicable measure is the types of zoning by key wildlife habitat as an indication of potential. Figure 4-17 displays how the action alternatives designate more Z-1 (retain in public ownership lands with high public value) and Z-3 (sell or exchange them for lands with higher public value) than Alternative 1. The action alternatives would retain a greater percentage of key wildlife habitats, but would also designate approximately 10% more key habitats as Z-3 than Alternative 1. These lands are mostly scattered tracts that are more difficult to manage. Without site-specific survey, it is impossible to say if there are important wildlife structures or habitat on these parcels. Actual land exchange and disposal proposals would be analyzed through the appropriate NEPA processes on a case-by-case basis.

Table 4-18 shows the variation in land tenure zoning by alternative and Key Habitat type. The action alternatives increase the amount of Z-1 in each of the key wildlife habitats. Disposal of key habitats is a concern especially if those habitats are limited. The action alternatives propose increases in Z-3 on the following approximate percentages of the total habitat type on BLM lands in the plan area: sage-grouse (6%), bald eagle winter roost (3.5%), elk winter range (11.5%), and elk critical winter range (5.4%). Considering all zoning allocations, the action alternatives assume less risk of habitat loss than Alternative 1 due to the greater amount of lands zoned for retention.

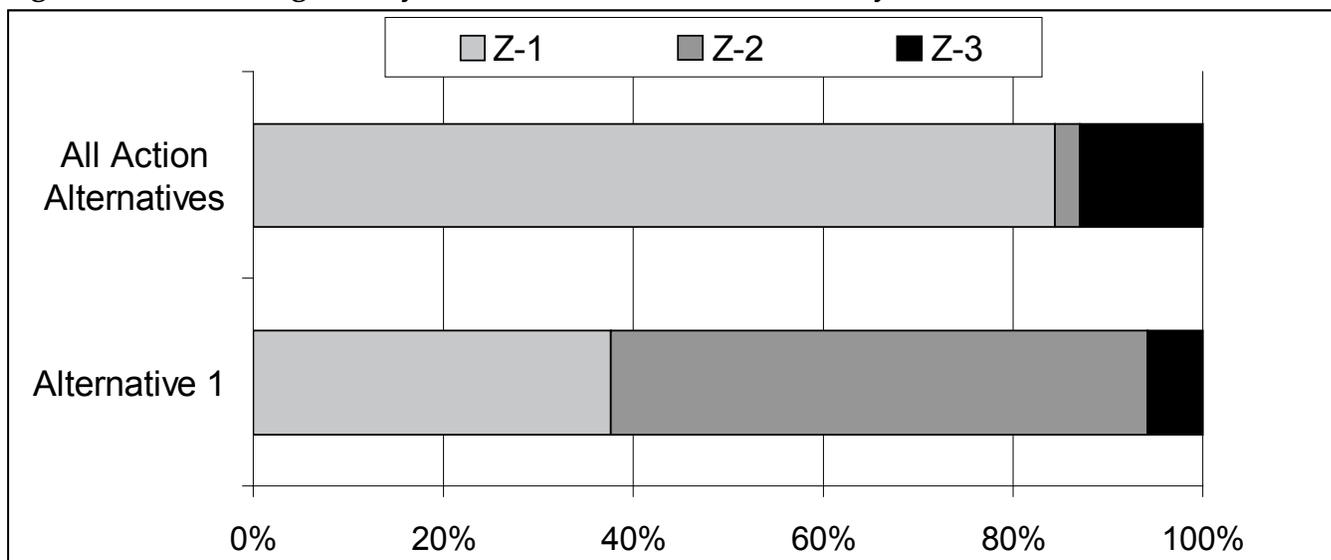
Reasonably foreseeable realty actions include several proposals for legislated land exchanges around Rudio Mountain and other areas. These land exchanges generally follow the direction and objectives of the Lands and Realty Objectives with a few exceptions, such as zoning. Based on a brief review of currently proposed tracts, the following changes of habitat management are likely:

- The loss of medium potential peregrine cliff habitat would be countered with blocking up two peregrine cliff habitat sites and surrounding them with BLM land.
- Acquisition of lands adjacent to open areas may improve enforcement and compliance in those areas.
- In other areas, acquired lands would be adjacent to wildlife habitat already designated as Limited for OHVs. Total amounts of wintering habitats exchanged would be similar; however, the exchange would block up habitats and make it easier to implement seasonal closures and habitat restoration projects.

### **Minerals and Energy Development Rights-of-Way Effects on Wildlife**

The development potential of mineral and energy resources changes through time as the technologies that allow for their extraction change. Effects to wildlife habitat or use can be short term and localized (e.g., infrequently removing material from a pit outside of critical periods), or long term and extensive in scope (installing a power or telephone line that increase the amount of raptor/corvid predation on ground nesting birds or small

**Figure 4-17. Percentage of key wildlife habitats on BLM land by land tenure and alternative.**



**Table 4-18. Acres of Key Wildlife Habitats on BLM lands by Land Tenure and Alternative.**

Key Wildlife Habitat	Alternative 1			Alternatives 2-5		
	Z-1	Z-2	Z-3	Z-1	Z-2	Z-3
Antelope Year Round	2,472	10,829	408	13,217	0	492
Bald Eagle Winter Roost	1,345	5,664	0	15,227	0	0
Bald Eagle Winter Roost Potential	7,326	7,904	0	6,802	23	180
Deer Summer	5,772	27,091	1,682	17,603	6,297	10,697
Deer Winter Range Crucial	97,521	135,605	21,894	223,502	3,949	27,281
Elk Summer	167,714	150,162	30,421	272,684	17,810	57,734
Elk Winter Range	76,768	124,601	7,553	177,122	0	31,516
Elk Winter Range Critical	26,095	83,559	119	103,436	0	6,057
Peregrine Foraging	419	2,067	0	2,486	0	0
Peregrine Potential Nest	1,932	1,011	181	3,036	0	87
Sage-grouse	6,948	51,107	0	54,509	0	3,531
Washington Ground Squirrel	6,061	0	240	6,332	0	0

mammals). Because there are no specific actions being evaluated at this time, the indicator of effects between alternatives is the level and type of protection provided to wildlife or wildlife habitats.

Alternative 1 currently has limited guidance for wildlife protection from minerals, energy, and other development than general objectives about not causing a trend toward federal listing. The action alternatives provide specific direction that restricts timing and location around important wildlife or habitat features (see Wildlife, Chapter 2). The action alternatives provide increased protection for big game security habitat, cave/bat habitat, and sage-grouse leks. They also increase the protection for Washington ground squirrels through designation of the Fourmile segment as an ACEC. The protection of wilderness characteristics on 19,442 to 35,457 acres of BLM lands in the action alternatives would also limit surface occupancy and thus reduce the risk of disturbance in wildlife habitat.

There are less than 2,300 acres of moderate to high potential wind energy locations in the plan area. The action alternatives preclude wind energy development on approximately 200 more of these acres than Alternative 1. Bat fatalities associated with wind farms have been documented around the world. It is not known at this time if any of the moderate to high potential sites are within bat movement corridors. Site-specific analysis for each proposal would be reviewed prior to approval of any right-of-way or wind tower. Alternative 1 would have slightly more risk of having wind tower or right-of-way proposals that would result in actions that intersect bat movement corridors. Disturbances associated with wind energy facility construction and maintenance has the potential to displace nesting females and impact local breeding populations. Additional BMPs consistent with those described in the Greater Sage-grouse Conservation Assessment and Strategy for Oregon (Hagen 2011) for wind energy development have been incorporated into all alternatives (see Chapter 2 and Appendix B).

### **Agricultural Leases Effects on Wildlife**

There are three categories of agricultural leases: restoration of floodplains, wildlife food and cover plots, and commercial leases to farmers.

Restoring floodplains (including the Inter-Mountain Basins Montane Riparian Systems, Rocky Mountain Montane Riparian, and Riparian BpSs) would improve cottonwood potential within these riparian areas. As cottonwood increased, so would yellow billed cuckoo habitat potential. Even with high vegetation growth rates, habitat is not expected to substantially increase for more than 20 years.

Wildlife food and cover plots provide higher levels of forage and cover for locally important upland game birds, stop over food sources for some migratory birds, higher concentrations of prey for predators such as hawks, and winter food sources for big game. Managing these areas in food and cover plots increases the number of

individuals and diversity of wildlife that utilize these sites. Food and cover plots can also keep wintering wildlife on public lands during the winter, thus reducing conflicts on surrounding private lands.

Commercial agricultural leases provide increased levels of forage, but due to the nature of the crops (generally hay or alfalfa) it is more advantageous to meadow nesting birds and big game. Because the BLM would not control the type of crop, its value to meadow nesting birds may vary from year to year. If maintained in grass hay with haying delayed until later in the summer, these sites could provide nesting opportunities for species such as bobolinks.

Alternative 1 proposes to restore 500 acres and allow 180 acres of commercial or wildlife food and cover. The commercial and wildlife food and cover would be within the currently allocated agricultural lease. Of the 180 acres, commercial use would take precedence over wildlife food and cover if demand exists. Based on current demand, approximately 50% is in commercial use. The current use of 180 acres amounts to approximately 0.33% of the relevant riparian habitats on BLM lands in the plan area.

The action alternatives propose to restore 400+ acres and would allow up to 400 acres of commercial or wildlife food and cover at any one time within the identified 1,200 acres potential. Commercial uses would not take precedence over wildlife food and cover; rather, the decision would be made on a case-by-case basis. For purposes of analysis, it is assumed that 200 acres would be managed in commercial and wildlife food and cover (based on current demand percentages). These acres would be distributed across more of the plan area than Alternative 1, which would increase their juxtaposition to a greater diversity of surrounding habitats. This increased diversity and increased acres under the action alternatives would benefit a greater variety of wildlife species when maintained in an agricultural lease. There is also increased risk under the action alternatives of noxious weed and nonnative invasion and expansion due to increased disturbance in these areas (e.g., plowing, seeding, haying equipment, increased hunter use, rehabilitation failure).

### **Summary of Effects of Actions on Priority Community and Threatened, Endangered, and Sensitive Wildlife Species**

There are 31 Sensitive species documented or suspected in the plan area and no known Threatened or Endangered wildlife species. Impacts associated with the following actions would have the greatest impact to Threatened, Endangered, and Sensitive species: travel management direction and interim road densities, OHV designations, and vegetative treatment types and locations.

Alternative 1 accepts the greatest risk that impacts from motorized use (especially off road) and vegetation changes would cause a trend toward federal listing before monitoring data would suggest a needed change in management. The action alternatives would assume less of a risk that a species habitat or population would be threatened due to actions associated with these alternatives. The reduced risk in the action alternatives is due to the combination of vegetative communities being managed for a variety of habitat components consistent with site potential and disturbance, reduced levels of off road motorized use, and criteria to direct transportation planning to protect sensitive populations and habitats. Interim road densities in Alternatives 2, 4, and 5 also assume less risk to populations by limiting the scope of motorized access to wildlife habitats until a transportation plan is written.

All alternatives require that a site-specific analysis of impact be completed prior to implementation of habitat altering projects. Actions associated with all alternatives are not expected to cause a trend toward federal listing of any wildlife species in the plan area.

### **Special Status Amphibians**

#### ***Special Designations and Wilderness Characteristics Management Effects on Special Status Amphibians***

Alternatives 2 through 5 would have greater land protections in the form of ACECs, RNAs, and areas managed for wilderness characteristics, which could provide greater protection to the Columbia spotted frog than Alternative 1.

#### ***Livestock Grazing Effects on Special Status Amphibians***

Grazing in Columbia spotted frog habitat in the early spring between the end of March and the beginning of June could have an adverse effect on breeding. Eggs are laid in shallow pools and sloughs and may be trampled

by watering cattle. Light to moderate grazing outside of the breeding season would not always be detrimental to spotted frogs. This species only thrives in low vegetation; it often disappears when the vegetation becomes too high and dense. Where vegetation is naturally low, grazing may reduce populations if grazing removes too much of the sedge/rush plant community. This leaves the frogs open to predation by great blue herons and garter snakes. The alternatives do not differ in proposed direction for season of use, so there would be negligible differences in their effects on spotted frog habitats and populations. Maintaining stubble height above 6 inches in riparian areas could mitigate adverse effects.

### ***Noxious Weed Management Effects on Special Status Amphibians***

Since the management of noxious weeds would feature essentially the same management approach for all alternatives, effects of noxious weed management on the Columbia spotted frog would be similar between alternatives. The removal of noxious weeds by means other than spraying would be more beneficial to the species.

## **Special Status Mollusks**

### ***Fire Management Effects on Special Status Mollusks***

Deixis consultants could not find any live Dalles mountainsnails in the Biggs area in 1995. They believe that the snail could have been eliminated by wildfires that occurred in the area in 1994. It is likely that any widespread burning of the habitat could reduce populations of the snail. This would be true for all alternatives. The greater number of acres of prescribed fire and fire to achieve resource objectives under Alternatives 2–5 may cause greater reductions in populations than Alternative 1, depending on fire locations. Following BMPs for sensitive species during project planning and implementation would mitigate any adverse effects under all alternatives.

### ***Aquatic Habitat Management Effects on Special Status Mollusks***

Under Alternatives 2–5, additional protections would be available to springs associated with talus habitat where the Dalles mountainsnail is found relative to Alternative 1.

### ***Livestock Grazing Effects on Special Status Mollusks***

Terrestrial snails are vulnerable to intensive grazing since they occupy the soil surface and are easily crushed by the hooves of cattle, sheep, or horses as well as those of native ungulates. Frest and Johannes (1995) consider grazing as a threat to the Dalles mountain snail and state that the species is absent from heavily grazed area. Since the species is found in talus piles, exposure to hooves would be limited except where there was an associated spring that could attract livestock. Native ungulates would not be a problem unless populations were unusually high. The threat could occur under any of the alternatives, but would likely be greater under Alternative 1 since this alternative has the potential for fewer grazing allotment closures to authorized grazing use than the action alternatives.

### ***OHV Use Effects on Special Status Mollusks***

There are no specific rules that would protect the Dalles mountainsnail under any of the alternatives. Since there are no known populations of the Dalles mountainsnail in the plan area at present, it is difficult to say whether or not there would be an impact. The snails are found in locations that would not often be used by OHVs unless they were rock crawling on the talus slopes. Limitations of OHV use largely to designated roads and trails under Alternatives 2–5 would reduce the likelihood of an adverse effect on the Dalles mountainsnail relative to Alternative 1.

### ***Recreation Effects on Special Status Mollusks***

Recreational activities, such as hiking and camping, would have negligible effects on the Dalles mountainsnail under all alternatives.

### ***Vegetation Management Effects on Special Status Mollusks***

There would be little effect from terrestrial vegetation management on the Dalles mountainsnail. The locations in which these snails are found are not usually densely vegetated and would not normally need to be treated for high fuels build-up.

### **Noxious Weed Management Effects on Special Status Mollusks**

Frest and Johannes do not expressly list weed management as a threat for the Dalles mountainsnail; however, they do not consider herbicide spraying as a threat for many other terrestrial species. It is likely that they considered the Dalles mountainsnail to be found in mostly weed free areas and, therefore, safe from that threat. Where the species is found without an associated spring, spraying of infestations (such as knapweeds or dalmation toadflax) may result in an adverse impact under all of the alternatives.

### **Mineral Development Effects on Special Status Mollusks**

The use of talus as fill or to produce gravel would eliminate populations of the Dalles mountainsnail associated with the margin of springs in talus slopes within 10 miles of the Columbia Gorge. Frest and Johannes found that many populations of snails in the Columbia Gorge were decimated as talus was used in the construction of dams and railroads.

### **Effects of Current and Reasonably Foreseeable Future Management**

Future management on BLM, Forest Service, State, private, and other land within the plan area is assumed to be similar to current management. The Forest Service Schedule of Proposed Actions (SOPA) is indicative of the types of management actions that are likely to continue into the future throughout the plan area (see the list of reasonably foreseeable actions, above).

### **Cumulative Effects on Wildlife**

#### ***Vegetation, Fuel, and Fire Management***

Planning area land managers generally share the objective of reducing ladder fuels to help reduce the potential for crown fires. This includes thinning and using prescribed fire to reduce potential for stand replacing fires. Forest managers will conduct small tree thinning, underburning, hand piling, and slash lopping to reduce fuels; hazard trees removal; and recover the value of dead and dying timber damaged by wildfires. Commercial and noncommercial thinning of dry site forest and woodlands will be conducted to reduce tree competition and improve stand health and vigor, resulting in stand trajectories likely to hasten the development of larger trees. Removal of post and pole size lodge pole through personal use post and pole removal is also likely to occur at a scale (several hundred acres) not expected to influence availability and BpS distribution within the planning area.

Land managers across the plan area will continue site-specific treatment of invasive plant species on thousands of invasive plant sites. Treatment methods include herbicides, manual, mechanical, and cultural treatments. The National Programmatic EIS for Vegetation Management addresses the cumulative effects of these types of activities.

Early spring or fall prescribed burning of native open forest and grasslands by other public and private land managers in the plan area will increase vegetation growth and vigor, rejuvenate brush and increase brush sprouting, stimulate grass production, open some closed canopy, and reduce ladder and ground fuels. The end result is decreased risk of stand-replacement fires as well as increased forage value, primarily for ungulates. Local impacts to nesting birds due to spring burning are possible if burns coincide with nesting seasons.

#### ***Lands and Realty***

Landowners continue to seek opportunities to consolidate ownership of Federal, state, and private lands. Assuming that national trends in the migratory patterns of retirees to the inland Northwest continue, private lands are likely to become subdivided into smaller parcels for retirement homes and recreation uses. Local disturbances and losses of habitats due to development are likely to increase with increased population and recreation uses.

The Forest Service will continue to issue special use permits for rights-of-way of primary power lines with 40-foot poles across the plan area. Other utility corridor permits may be issued for buried utility corridors. The number of communication corridors and sites such as fiber optic cable and cell towers is likely to increase with increasing demand, resulting in short-term construction-related disturbances and potential loss of habitat with corridors where vegetation is removed.

## **Livestock Grazing**

The Forest Service will continue to authorize and permit livestock grazing on most of their allotments. Re-authorizations will likely continue according to current grazing management. Grazing management will be modified in authorizations if existing grazing management does not demonstrate maintenance of desired conditions or movement toward desired future condition described in Forest Land and Resource Management Plans. A few Forest Service allotments may be removed from permanent allotment status. Fencing is likely to continue within and around Forest Service allotments. Effects to wildlife due to livestock grazing on Forest Service lands are likely to be similar to those identified on BLM lands.

## **Mining**

The Forest Service will analyze existing and proposed mining plans of operations for active mining operations, such as those within the Lower Granite Creek Watershed. Land managers will continue to close abandoned mines by filling in adits (see glossary), trenches, and shafts with earth and rock from existing mine spoil piles and recontouring slopes adjacent to work area. Closure and filling of adits and mine shafts has the potential to reduce local roosting habitat for several bat species.

## **Recreation**

Forest Service recreational camp sites will likely increase and will include attributes such as handicap accessible tables, fire rings, concrete vault toilets, gravel parking spurs and access roads, bulletin boards, signs, shelters for winter and summer use, and possible placements of boulders around campground perimeters. Land managers may remove and replace toilets in or adjacent to existing footprints. Some projects will relocate parking areas, construct new sections of trail, and adjust interpretive signing. In addition, fences will be constructed to minimize conflict between recreation and other uses. Increased recreation facilities and access may affect local wildlife via increased disturbance.

## **Planning**

The Forest Service will eventually update their forest plans for the Umatilla, Wallowa-Whitman, Malheur, and Ochoco National Forests. This will afford an opportunity to address issues similar to those addressed in this BLM plan. Forest Service plans are not likely to propose radical adjustments from current land management (except for complying with updated travel management regulations), but are likely to add flexibility and resource protection.

The combination in the action alternatives to limit most OHV use to designated routes, close allotments to grazing where necessary, and implement ecologically appropriate vegetative treatments will together increase the likelihood of reaching ARV objectives over existing management (Alternative 1). The action alternatives will also better facilitate the use of fire to achieve resource objectives, and reduce the potential for spread of noxious weeds.

All alternatives have BMPs that would limit the impacts of multiple treatments on any one piece of ground.

# **Wild Horses**

## **Introduction**

Analysis of the environmental consequences of the alternatives on wild horses considered the following key resources or resource uses: Vegetation (management), Livestock Grazing (water development), and Recreation Opportunities.

Indicators used to compare environmental consequences between alternatives include wild horse habitat quality.

Wild Horses on the Murderer's Creek Wild Horse Management Area (HMA) will be managed the same in all alternatives. The Management Plan for the HMA was revised in October 2007 and will guide BLM management activities.

Alternatives 2–5, which contemplate increased acreages of tree thinning, would provide increased forage for wild horses. Habitat would also be improved to a greater extent by fuels treatments under Alternatives 2–5 than Alternative 1.

Additional water developments will benefit wild horse habitat. Since Alternatives 2-5 propose a greater number of allotment closures if the permit is relinquished than Alternative 1, they may not result in as many new water developments.

Under all alternatives, increased levels of recreational activities (such as more OHV use in the Murderer’s Creek HMA) will increase harassment of wild horses and may render some habitat unavailable to wild horses, at least seasonally.

## Lands with Wilderness Characteristics

### Introduction

Managing certain lands outside of Wilderness Areas and WSAs to protect their wilderness characteristics would help protect the natural condition on these areas and provide opportunities for solitude or primitive and unconfined recreation.

Analysis of the environmental consequences of the alternatives on lands identified as having wilderness characteristics considered the following key resources or resource uses: Vegetation, Fire and Fuels, Wildlife, Wild Horses, Visual Resources, Special Designations, Paleontological Resources, Cultural Resources, Livestock Grazing, Recreation Opportunities, Access and Travel Management, Energy and Mineral Resources, and Lands and Realty.

Indicators used to compare environmental consequences between alternatives include: number of acres found to have wilderness characteristics that are identified for protection of their wilderness characteristics.

### Lands with Wilderness Characteristics Assumptions

- Managing lands with wilderness characteristics under VRM Class II objectives will provide a balance between protecting visual resources and allowing limited vegetation treatments to occur under some alternatives. Vegetative treatments may include limited mechanical treatment of juniper and thinning of diseased forests and woodlands for the purpose of maintaining or restoring ecological condition and long-term wilderness characteristics.
- Proposed projects and uses such as fuels treatments, noxious weed control, riparian or wildlife habitat improvements, wild horse management, and livestock improvements on lands identified as having wilderness characteristics would be evaluated on a case-by-case basis to ensure that any reductions in wilderness characteristics are temporary, and wilderness characteristics are maintained or enhanced over the long term. For most projects, temporary reductions in wilderness characteristics would recover through active or passive rehabilitation in less than five years. In the case of mechanical treatment of juniper and thinning of diseased forests and woodlands, wilderness characteristics would return to a treated area gradually as cut stumps decay and become less visible. Possible methods to speed the decay of stumps (such as prescribed fire) may be considered; however, the rate of decay varies with natural processes and is uncertain. Over the long term, the wilderness characteristics of a treated area would be enhanced.

The following resources or resource uses will have no substantive effects at the planning scale on lands identified as having wilderness characteristics: Soils, Air Quality, Native American Uses, and Recreation Opportunities (Recreation Permits and Special Recreation Management Areas). No known aquatic resources projects are proposed in lands identified as having wilderness characteristics. There are no known BLM lands managed for agriculture or significant Cave Resources that overlap lands with wilderness characteristics. In all alternatives except Alternative 4, none of the existing or proposed ACECs or RNAs overlap lands identified as having

wilderness characteristics. Alternative 4 has 2,400 acres proposed for designation as ACEC and that overlap areas to be managed for the protection of their wilderness characteristics.

## **Analysis of the Effects of the Alternatives on Identified Lands with Wilderness Characteristics**

For those lands where the BLM wilderness inventory update did not find wilderness characteristics to exist, there would be no effects to wilderness characteristics.

### **General Effects on Lands with Wilderness Characteristics Not Managed for Protection of Such Characteristics**

Under Alternative 1, the BLM would not manage lands identified as having wilderness characteristics located outside of existing Wilderness Areas and Wilderness Study Areas for protection. These characteristics would not necessarily be retained. Under Alternatives 2, 3 and 5, 16,015 acres of land with wilderness characteristics would not be specifically managed for the protection of those characteristics. The wilderness characteristics would not necessarily be impacted, but the potential for impacts exists. The BLM would continue to manage these lands the same as similar and adjacent lands. In some cases, the similar and adjacent lands are offered protections through decisions concerning visual resources, OHV designations, mineral resources, and rights-of-way that will protect elements of wilderness characteristics (see Table 4-19. Land Use Allocations that Protect Elements of Wilderness Characteristics). Where areas are not specifically managed to protect their wilderness characteristics, the BLM may allow actions such as mechanical vegetation treatments and route and facility construction that would not be allowable under VRM Class II objectives. For example, large-scale mechanical treatment of juniper or forest stands may result in large clearings containing tree stumps, making man's influence clearly visible. Permitting new right-of-way authorizations, allowing oil and gas leasing, and allowing wind energy development could result in new roads and new utility lines, which could increase noise from motorized activity. These highly visible and audible uses would reduce the natural character of the surrounding landscape and likely reduce the opportunity to experience solitude in the area.

### **Vegetation Management Effects on Lands with Wilderness Characteristics**

Continuing existing management in Alternative 1 would allow mechanical vegetative treatments to continue within existing restrictions. Such treatments have the potential to reduce the naturalness of lands with wilderness characteristics until cut stumps decay to the point that they no longer appear unnatural to the common observer. In Alternatives 2, 3, and 5, limited mechanical treatment of juniper and thinning of diseased or overstocked timber consistent with VRM Class II objectives on approximately 40% of the 19,442 acres managed to protect wilderness characteristics would help maintain or restore ecological condition and long-term wilderness characteristics. Proposed vegetation treatments would be evaluated on a case-by-case basis to ensure that any reductions in wilderness characteristics are temporary, and wilderness characteristics are protected over the long term (see Assumptions above). Alternative 4 would not allow mechanical vegetation treatment on 35,457 acres that possess wilderness characteristics. The lack of mechanical treatment on phase III juniper stands and overstocked forest stands has the potential to result in negative ecological trends that would reduce the sites productivity and result in conditions that do not represent a natural state for those plant communities. Noxious weed control would be permitted regardless of the alternative selected.

### **Fire and Fuels Management Effects on Lands with Wilderness Characteristics**

Under Alternative 1, all wildfires would be suppressed and there is no direction for the use of fire to achieve resource objectives. Actions such as mechanical treatment or uncharacteristic wildfire alter the vegetation and change the landscape's texture, color, and pattern. Full suppression frequently alters the landscape and increases accessibility with construction of routes and travel with mechanized equipment. As the landscape is altered and access increases, naturalness and solitude would be reduced.

Managing fire within the full array of appropriate responses under Alternatives 2-5 would move the landscape vegetation toward attainment of natural fire regimes. Use of fire to restore the vegetation translates into less mechanical disturbance of the vegetation. When using fire to achieve resource objectives, minimum impact management tactics would be used and a Resource Advisor would bring forward concerns specific to protecting

wilderness characteristics. In combination, the restoration of natural fire regimes, the reduction of mechanical disturbances, and the use of a Resource Advisor would all promote naturalness.

### Wildlife Management Effects on Lands with Wilderness Characteristics

Greater seasonal area closures for motorized vehicles as proposed in Alternatives 2-5 would have very little effect compared to current management (Alternative 1) or the other action alternatives on areas managed to protect wilderness characteristics, as there are currently very few routes open to motorized use. Current winter use of these routes is minimal, and some of the winter activities are illegal in nature, including unauthorized wood cutting and access for unauthorized cross-country vehicle use associated with horn hunting. Closing the designated routes to motorized use during winter months may help reduce incidences of illegal activities, requiring all users to travel by foot, horse, or boat during the winter season.

### Wild Horse Management Effects on Lands with Wilderness Characteristics

Under all alternatives, proposed wild horse management projects would be evaluated on a case-by-case basis. Under the action alternatives, evaluations of projects proposed on lands with wilderness characteristics that will be managed to protect such characteristics would ensure that any reductions in wilderness characteristics are temporary, and these values are protected over the long term.

### Visual Resources Management (VRM) Effects on Lands with Wilderness Characteristics

Under Alternative 1, the BLM would not offer specific protections for lands identified as having wilderness characteristics, and the visual resources of these lands would be managed similar to adjacent lands. Under the action alternatives, providing VRM Class II management for lands managed for wilderness characteristics would help protect the naturalness element and provide a balance between protecting visual resources and allowing some fuel treatments to occur, including limited mechanical treatment of juniper and thinning of diseased or overstocked timber (see Table 4-19).

### Special Designations Management Effects on Lands with Wilderness Characteristics

Management of designated Wild and Scenic Rivers and WSAs would continue as under current management, and would not differ in effects between alternatives. Under the action alternatives, protective management of lands with wilderness characteristics that are adjacent to WSAs may offer some additional protection to these WSAs in some cases, such as reduced incidence of unauthorized motorized vehicle use and reduced visual effects from adjacent energy, mineral, or facility developments. There are no eligible or suitable Wild and Scenic Rivers overlapping lands with wilderness characteristics. Under all action alternatives, if Sutton Mountain WSA were released from consideration for wilderness by Congress, management direction for the Black Canyon ACEC/RNA would preclude road construction and mechanical treatments thus protecting the wilderness characteristics.

**Table 4-19. Land Use Allocations that Protect Elements of Wilderness Characteristics.**

	Acres Identified for Protection of Wilderness Characteristics*	VRM Class II	OHV Closed or Limited	ROW Avoidance or Closed	Mineral Resources Avoidance, NSO, or Closed	Repetitive Mechanical Vegetation Treatments Prohibited	Road Density of 0 mi./sq.mi.
Alternative 1 Existing Management	0	18,582	14,929	17,817	2,000-5,299**	0	0
Alternatives 2, 3, 5	19,442	30,633	30,633-32,169 ***	35,457	35,457	12,275	19,442
Alternative 4	35,457	35,457	35,457	35,457	35,457	35,457	35,457
* Total of 35,457 acres identified with wilderness characteristics. ** Acreage depends on mineral type. *** Acreage depends on alternative selected.							

## **Cultural and Paleontological Resource Management Effects on Lands with Wilderness Characteristics**

Under all alternatives, proposed cultural and paleontological resource projects such as excavations would be evaluated on a case-by-case basis. Under the action alternatives, evaluations for projects proposed for areas managed to protect lands with wilderness characteristics would ensure that any reductions in wilderness characteristics are temporary and that wilderness characteristics are protected over the long term.

## **Livestock Grazing Effects on Lands with Wilderness Characteristics**

Most lands identified as having wilderness characteristics currently have active grazing allotments. Livestock grazing in lands with wilderness characteristics would continue as under current management and would not differ in effects between alternatives, except when considering new livestock developments. Under the action alternatives, evaluations of livestock developments proposed for areas managed for protection of wilderness characteristics would ensure that any reductions in wilderness characteristics are temporary and that wilderness characteristics are protected over the long term.

## **Recreation Management Effects on Lands with Wilderness Characteristics**

### ***Facilities***

Areas managed for protection of wilderness characteristics would be closed to construction of new buildings under Alternatives 2-5, but would be open to new construction under Alternative 1, with the possibility of adversely affecting their wilderness characteristics.

### ***OHV Management***

Continuing existing management under Alternative 1 would continue current OHV restrictions, limiting vehicle use to signed designated routes for all of these lands except Big Canyon, which is currently open to cross-country vehicle use. Alternatives 2-5 would limit OHV use to signed designated routes on all lands managed to protect wilderness characteristics, including Big Canyon, which would help prevent new unauthorized routes from being created, reduce unauthorized cross-country vehicle use, and prevent the spread of noxious weeds (See Table 4-19).

## **Travel Management Effects on Lands with Wilderness Characteristics**

Areas with wilderness characteristics currently contain no roads. Alternative 1 would not limit new road construction in these areas; should construction of new roads occur across these lands, it would reduce their naturalness and wilderness characteristics. The action alternatives would preclude new road construction on those areas managed to protect wilderness characteristics. The limitations on new road construction would apply to the greatest number of acres in Alternative 4, which would protect 16,015 more acres with wilderness characteristics than would Alternatives 2, 3, or 5.

## **Energy and Mineral Resources Management Effects on Lands with Wilderness Characteristics**

Continuing existing management under Alternative 1 would allow energy and mineral development of these lands to continue within existing restrictions to protect wilderness characteristics. In Alternatives 2-5, managing lands to protect wilderness characteristics as available for mining operations (provided that the proposed use would not affect wilderness characteristics), and under no-surface-occupancy requirements for fluid mineral development and closing them to wind energy development, would better protect their wilderness characteristics. Alternative 4 would provide these protections to 16,015 more acres than Alternatives 2, 3, or 5.

## **Lands and Realty Management Effects on Lands with Wilderness Characteristics**

### ***Land Tenure***

Those lands for which wilderness characteristics would be protected (0 in Alternative 1; 19,442 acres in Alternatives 2, 3, and 5; and 35,457 acres in Alternative 4) are designated as Z1 and thus would not be available for exchange or sale.

## **Use Authorizations**

Continuing existing management under Alternative 1 would allow rights-of-way to be issued on lands with wilderness characteristics within existing restrictions. In Alternatives 2-5, identifying lands that would be managed to protect wilderness characteristics as right-of-way exclusion areas would help to protect their wilderness characteristics by preventing new development; Alternative 4 would provide this protection on a greater number of acres (see Table 2-23).

## **Cumulative Effects on Lands with Wilderness Characteristics**

The character of adjacent state or private lands is not considered when evaluating the wilderness characteristics of a wilderness inventory unit. Independent actions on adjacent lands would not have an effect on lands identified as having wilderness characteristics. Where BLM inventory units are adjacent to USFS or NPS lands managed with a wilderness emphasis by those agencies, BLM evaluated the opportunity for solitude and primitive unconfined recreation in combination with the opportunities available on those adjacent lands. Protecting the wilderness characteristics of BLM managed public land that is contiguous to other federal lands already managed with a wilderness emphasis could improve management consistency between agencies and thus improve the protection of wilderness characteristics for the block of lands as a whole.

## **Cave Resources**

Alternative 1 provides less protection to cave resources, and could result in greater disturbance of significant cave resources than the action alternatives. Since cave management direction is lacking in existing RMPs for the plan area, caves would continue to be managed in accordance with the BLM national and Oregon/Washington Cave Management Policy. These policies would serve to protect known cave resources in general, but do not specifically restrict adjacent habitat disturbing activities.

The action alternatives provide specific management direction to identify, protect, and enhance cave resources on public lands, including development of a cave management plan for Wild Horse Point Cave. In addition, the action alternatives would limit management disturbance within 350 feet of any cave on public land, potentially restricting uses on 9 acres. Areas within 0.5 mile of any cave would be rights-of-way avoidance areas (see Lands and Realty section of this chapter). The 350-foot and 0.50-mile perimeter restrictions around any known cave under the action alternatives would reduce the potential for surface disturbance from management activities more than Alternative 1.

## **Visual Resources**

### **Introduction**

Analysis of the environmental consequences of the alternatives on visual resources considered the following key resources or resource uses: Vegetation, Fire and Fuels, Aquatic Resources, Visual Resources, Special Designations, Recreation Opportunities, Travel Management, Energy and Mineral Resources, and Lands and Realty.

Indicators used to compare environmental consequences between alternatives include: visual quality and acres of VRM Management Classes I through IV.

Except for recently acquired and previously existing contiguous public lands in the North Fork of the John Day River, the BLM used the existing VRM Inventory Classes from the Two Rivers, John Day, and Baker RMPs to determine final VRM classes for public lands across the John Day Basin plan area. The allocation of VRM classes by alternative is summarized in Table 4-10. In all the action alternatives, the VRM class meets or exceeds the inventory class.

## Visual Resource Assumptions

- All activities would conform to each VRM class, as proposed in each alternative.
- There may be short- and long-term effects to visual quality, depending on the action or activity.
- While VRM inventories may include all land jurisdictions and ownerships, BLM visual resource management decisions only apply to BLM lands.
- No actions proposed in any alternative are expected to change a VRM class due to VRM class objective constraints.

## Analysis of the Effects of the Alternatives on Visual Resources

Impacts on visual resources are primarily evaluated on a project-specific basis by evaluating the degree of change, or contrast created within a characteristic landscape. Activities that result in the most contrast and are most noticeable to the public are considered to have the greatest effect on scenic quality. Most of the effects described in this section are relative to landscape-scale potential actions. Site-specific analysis will be conducted prior to any specific project implementation. These analyses will include visual contrast evaluations as required by BLM VRM policy.

### Vegetation Management Effects on Visual Resources

Vegetation removal, forest thinning, fire-killed vegetation, and limited road construction would decrease visual quality in the short term. Surface disturbance and contrasts between treated and untreated landscapes would be less over the long term if VRM project objectives are followed as required by all action alternatives. There would continue to be a higher potential for stand-replacing wildfire in forestlands in the South Fork and North Fork John Day River and in the Rudio Mountain area under Alternative 1 compared to the other alternatives due to a lower level of proactive thinning.

Alternative 1 would result in a higher probability of adverse visual effects from uncharacteristic fire due to a smaller area of fuels treatment proposed in these areas and less emphasis on forest and woodland management, compared to all of the action alternatives. Fewer long-term benefits to visual quality in forestlands would occur, which would contribute to a higher probability that landscapes would burn with limited or no live vegetation remaining.

The action alternatives contain direction for management of differing seral structural conditions, patch sizes, and connectivity not contained in Alternative 1. These actions would, when applied across a landscape, result in a more diverse and natural appearing visual setting.

### Riparian and Aquatic Habitat Management Effects on Visual Resources

Rivers and creeks contain the most vegetative diversity of all habitat types, and flowing water enhances visual quality. Riparian and aquatic habitat actions that sustain, enhance, or protect watershed functions, fish habitat and water quality in these habitats, would also enhance visual quality. Riparian management direction contained in Alternative 1 would apply to a much smaller portion of the landscape than direction contained in the action alternatives. The ability to treat vegetation within riparian areas may result in short term visual changes but through time would increase the visual quality of these areas.

### Fuels and Fire Management Effects on Visual Resources

Alternative 1 would have less area where WUI fuels treatments would occur. These are typically some of the more aggressive vegetative treatments. Thus, the action alternatives are expected to have a greater number of acres with potential for higher visual contrast. Individual projects would still meet VRM contrast ratings. However, visual resources would be protected in the long term by reducing the amount and severity of potentially uncontrolled wildfire by reducing high fuel loads. Additionally, the ability to utilize appropriate fire management tools would also reduce the potential for stand-replacing wildfire that has a dramatic effect on visual quality. Short-term impacts of fire suppression would be higher under Alternative 1 than the action alternatives.

Short-term adverse impacts from prescribed burns would have limited effects if mitigation measures are followed. Project layout design using VRM mitigation actions could reduce short-term effects and may enhance visual quality over the long term by creating vegetative mosaics and diversity across the landscape.

Rehabilitating landscapes damaged by wildfires under any alternative would help minimize the severity of wildfire impacts on visual resources in the long term. Short-term effects may be apparent if burned landscapes are next to roads or areas seen by public land visitors. The use of fire lines and retardant would cause noticeable changes to the “natural environment” that some visitors define as a conifer, or juniper covered landscape, without regard to their ecological condition. Public evaluation and acceptance of burned landscapes is dependent to some degree on individual understanding of the role of wildfire and the influences of past management in forest ecosystems.

### **Special Designations Management Effects on Visual Resources**

The action alternatives would designate additional ACECs, a Wild and Scenic River on the North Fork (with the exception of Alternative 4), Back Country Byway, and wilderness character protection areas that do not exist in Alternative 1. Each of these areas has VRM designations designed to provide the appropriate level of visual protection. However, because of the additional sensitivities of these areas, certain developments such as wind energy development are precluded primarily due to the special designation rather than the visual resource designation. Alternative 4 would provide the greatest amount of acres with additional visual resource protection relative to wilderness character; however, it does not propose the North Fork as suitable for designation as Wild and Scenic River.

### **Visual Resources Management Effects on Visual Quality**

Retention and enhancement of visual quality on public lands would continue to be governed by BLM VRM Classes I-IV objectives. Visual quality may be enhanced or decrease, depending on VRM class; the location of public land; the size, number and type of projects developed within a landscape; and visual mitigations. Table 4-10 summarizes the area in each VRM class across the plan area by alternative. The action alternatives all have VRM designations that meet or exceed recommended visual protection levels based on visual inventory analysis. The action alternatives would designate 41,867 more acres in the North Fork of the John Day as VRM Class II than would Alternative 1. Alternative 4 would designate 4,822 acres of VRM Class II, more than the other action alternatives throughout the planning area due to additional wilderness character protection.

### **Recreation Management Effects on Visual Resources**

Under Alternative 1, visual effects would continue to increase from random OHV use, especially on public lands near residences. Alternative 1 designates 234,272 acres as Open to off-road OHV use. Alternative 1 provides the largest amount of area open to OHV use as well as the longest season of use. Off-road use during periods when soils are moist has the potential to remove vegetation and create scars on the landscape that can persist for years or even decades, depending on the location.

Under the action alternatives, about 230,000 acres would be shifted out of OHV open designation, mostly into OHV limited designation where motorized use is restricted to designated roads and trails. In these areas, development of new routes would be reduced. With fewer new routes being created in areas where motorized recreation occurs, visual quality would be retained to a greater degree under Alternatives 2-5 than under Alternative 1.

Under the action alternatives, recreation activities would have different effects on visual quality, but all activities managed within an SRMA would have less effect on visual quality due to more intense visitor management, such as limiting motorized use to designated roads and trails. Alternative 2 has more area managed under SRMAs than Alternative 1, helping avoid user-created trails that would reduce visual quality.

The construction of new recreation sites or the expansion of existing sites under Alternatives 2-5 would not impact visual qualities, if VRM project mitigation is followed. Recreation development in popular recreation use areas would be consistent with the prescribed setting character for that setting, and would reduce visual impacts of unmanaged recreation use in most cases.

Allowing cross-country OHV use in the 598-acre Golden Triangle area would create visual scarring on the landscape, but this area is small, limiting effects to visual quality in that area.

Under Alternatives 2 and 3, a 3,971-acre area on the Rudio Plateau would remain in OHV Open designation, which allows for unrestricted cross-country travel in all classes of OHV. Significant acreage elsewhere in the plan area is shifted out of OHV Open designation under Alternatives 2-5, which is expected to significantly reduce development of new user-created routes and associated visual impacts in these areas. However, it is possible that visual impacts may increase in the OHV Open area on the Rudio Plateau under Alternatives 2 and 3, if OHV designation changes elsewhere result in more intensive use of the Rudio area.

## **Energy and Mineral Resources Management Effects on Visual Resources**

Any development of mineral materials; oil, gas, and geothermal leasing; locatable minerals; and wind energy development has a high potential to change the natural character of the landscape. New structures, creation of new roads or upgrading existing roads, and project operation including delivery of resources to market would result in short- and long-term impacts on visual quality.

Alternative 1 would provide more public land acreage where energy projects would be allowed, or would be limited in a manner that retains visual character, than any of the action alternatives. The VRM project mitigation measures would reduce the significance of effects, but developments would reduce visual quality of the landscape where projects are allowed. Open designations at Little Canyon Mountain would occur in the existing pits only under the action alternatives. Both of the pits currently have high levels of bare soil with numerous OHV tracks. Open OHV activities would not change this character. Both pit locations are minimally visible, if at all, from the county road on the south and from individual residences. Effects of OHV activities are not expected to affect visual quality outside of the confines of the pits themselves for all alternatives. OHV trail creation allowed in Alternative 2, 3, and 4 would be constructed in a manner that would meet the visual standards established for this area.

## **Land Tenure, Realty, and Use Authorization Effects on Visual Resources**

Use authorizations may affect visual quality under all alternatives. New rights-of-way, leases, and permits, and road construction activities would have the potential to affect visual resources under all alternatives. Site-specific potential for additional access for power lines, pipelines, and wind and cell towers also have potential to reduce visual quality, because approval of these projects would change the landscape indefinitely.

The action alternatives provide more restrictions for rights-of-way than does Alternative 1. This would increase the potential to meet VRM designation objectives.

All alternatives allow for the construction of additional major power transmission lines within existing utility corridors only. Additional transmission lines would result in an incremental increase in the developed appearance of the landscape within existing utility corridors. Project design elements in these areas must minimize long-term visual impacts. Where transmission lines are adjacent to, or enter or cross the John Day River corridor, the lines and associated structures would be designed and located so as to minimize their visibility to river recreationists.

Acquisition of other lands to aggregate BLM public lands into more contiguous parcels through land exchanges could enhance or detract from existing visual quality of public lands, depending on the lands acquired or public lands disposed. Over the long term, land acquisition of lands to aggregate existing public land ownership patterns enhances visual quality and provides stable land uses that trend toward enhancement of visual quality on landscapes. Most public lands classified as Z-3 would not have high or sensitive visual qualities, but their natural condition may change by development, if disposed. Under Alternative 1, visual quality would continue to be maintained on public lands zoned 1 for retention. A greater number of acres may be exchanged out of public land ownership, without retention of existing visual qualities, under Alternative 1 than under any of the action alternatives 2-5 (Table 2-23).

The action alternatives designated more land as Z-1 zoned for retention; thus, these lands are more likely to remain in federal ownership where visual quality must be addressed on all projects. Specifically, visual qualities would be retained on public lands zoned Z-1 along the main stem John Day River, South and North Forks John

Day River, Dixie Creek and Little Canyon Mountain areas, Rudio Mountain and Johnson Heights, and public lands surrounding Sutton Mountain.

Lands zoned Z-3 have the highest potential to be removed from federal ownership and have subsequent development on them that could impact the natural appearance of the landscape. Although the action alternatives have a greater number of acres zoned Z-3 for disposal, they also have the largest amount of land zoned Z-1 for retention. Lands zoned Z-3 provide limited opportunities to manage for naturalness due to their small size and juxtaposition with other private lands.

Other public lands zoned Z-3 are within the vicinity of the John Day River, but it is unknown what effects could occur to visual quality if these lands were no longer public. Man-made improvements on these tracts of land visible from the river would reduce scenic quality along the main stem John Day river segment from Kimberly to Clarno river segment.

### **Summary of Effects on Visual Resources**

Visual effects on all public lands except in the North Fork John Day River area would differ between Alternative 1 and all of the action alternatives. The absence of proactive vegetative and fuel treatments in Alternative 1 would result in reduced visual quality in the short and long term, due to more stand-replacing wildfire events burning untreated forestlands in the South and North Fork John Day River areas and in the Rudio Mountain area. Actions in Alternatives 2-5 that shift most OHV use away from unrestricted cross-country travel to a system of designated routes would increase visual quality by reducing the extent of unplanned, user-created routes across the landscape.

Most of the planning area is classified as VRM Class II. Management actions in these areas would retain the visual character of the landscape. Changes to the landscape might be visible, but would conform to the predominant elements of form, line and color visible in the landscape and would not attract the attention of a casual observer. For example, the visual effects of fuels treatment in a forested area classified as VRM Class II would differ from the visual effects of developing an OHV route in the same area, but in either case the actions would meet VRM Class II standards. The appearance of the area might change somewhat, but observers would still perceive the area as forest.

Management actions in areas classified as VRM Class III could result in greater changes in visual appearance, but would still partially retain the visual character of the landscape. Changes resulting from management activities might attract attention, but would not dominate the view of a casual observer. Actions in VRM Class IV landscapes could result in a high level of change in visual landscape characteristics and might be a major focus of view attention, but every attempt would be made to minimize these effects through careful location, minimal disturbance, and repeating the basic visual elements.

### **Cumulative Effects on Visual Resources**

Population growth in central and eastern Oregon and increased development in the plan area are expected to increase public sensitivity regarding visual quality. The visual quality of open space on BLM lands provided next to communities such as John Day and other communities will increase in importance over time.

Reasonably foreseeable realty actions include several proposals for legislated land exchanges. These land exchanges generally follow the direction and objectives of the Lands and Realty Objectives with a few exceptions, such as zoning. The effects from these actions are within the effects disclosed for all alternatives.

Wind energy development is likely to continue to increase until all available areas from Condon and Grass Valley north to the Columbia River are developed. Other parts of the plan area with wind potential may be developed as well. Wind turbines currently being installed on private property measure 398 feet high and are visible for miles in all directions. Turbines and high-powered transmission lines associated with wind energy development will have a major effect on the visual resources of public and private lands. Due to the scattered nature of BLM lands in areas with high wind potential, the action alternatives would only slightly reduce the potential for visual impacts associated with wind energy development as the majority of development is expected to be on private lands, which will reduce the visual quality rating on adjacent BLM lands; however outside of the river canyon,

the majority of VRM designation is VRM Class III or IV. Sherman and Wasco counties have planning restrictions against putting wind turbines directly adjacent to the river canyon. The combination of the county ordinances and the fact that the canyon is very steep will provide protection to the visual quality experienced by visitors utilizing the river.

## Special Designations

### Wild and Scenic Rivers

Analysis of the environmental consequences of the alternatives on Wild and Scenic Rivers (WSR) considered the following key resources or resource uses: Wild and Scenic River Management, Aquatic Resources, Visual Resources, and Recreation Opportunities.

Indicators used to compare environmental consequences between alternatives are identified in Table 4-20.

### Wild and Scenic River Assumptions

- The existing 148-mile John Day River WSR segment and the 47-mile South Fork John Day WSR segment, totaling 195 miles, would continue to be managed to protect the free-flowing character of these rivers and also protect and enhance river ORVs, according to the BLM Manual 8351 and the 2001 John Day River Management Plan ROD.
- River segments found to meet eligibility criteria will receive interim protect of Outstandingly Remarkable Values until a planning decision determines suitability. A planning determination of “non-suitable” removes the interim protection.
- For eligible river segments recommended as “suitable,” BLM would provide interim protection of the Outstandingly Remarkable Scenic, Recreation and Fisheries Values according to BLM Manual 8351, until Congressional action is taken to either designate the North Fork John Day River as a WSR, or release it from further Congressional review. If released by Congress, BLM would continue to protect scenery, recreation and fishery values through other management guidelines such as ACEC and VRM Class II designation and the Aquatic Conservation Strategy.
- The State Scenic Waterway designations will continue into the future.
- Current county zoning will continue to allow limited development on private land, subject to State Scenic Waterway regulations.

**Table 4-20. Comparison of Management Effects on Outstandingly Remarkable Values (ORVs) of Wild and Scenic Rivers (WSR) by Alternative (BLM public lands in WSR segment only).**

ORVs would be affected by:	Common to All Alternatives	Alternative				
		1	2	3	4	5
WSR eligible/suitable/existing	195 miles existing WSR	37 mi	37 mi	37 mi	0 mi	37 mi
WSR classification (emphasis) miles	195 miles Rec.	0 mi Rec. 0 mi Scenic	0 mi Rec. 37 mi Scenic	19 mi Rec. 18 mi Scenic	0 mi Rec. 0 mi Scenic	0 mi Rec. 37 mi Scenic
VRM direction	195 miles VRM	0 mi VRM II 37 mi VRM III	37 miles VRM II 0 miles VRM III			
New ACS direction	—	0 miles	232 miles			
Open OHV designation	—	14,817 acres	0 acres			
SRMA designation for North Fork John Day River	—	10,658 acres	10,658 acres			

- Existing ORVs will continue to be protected and enhanced through existing and proposed management and through other resource programs, laws and objectives, such as PACFISH, Aquatic Conservation Strategy, and Visual Resource Management.
- On the North Fork John Day River, the checkerboard land ownership pattern of public and private or state lands limits the ability to effectively manage river resource values for grazing and land-based recreation uses and to provide public access to public lands without trespass on private lands.
- On the North Fork John Day River, the potential for energy development is considered low, because of the rural nature of the area and distance to highways and potential energy transmission corridors and existing State Scenic Waterway classification of the North Fork John Day River as an Accessible Natural River area.
- No water development would be allowed, given the high fishery, scenery and recreation ORVs of this river and existing State Scenic Waterway classification as an Accessible Natural River Area.

### **Outstandingly Remarkable Values**

- Scenery/Visual
- Recreation Opportunities
- Fish

### **Effects Common to All Alternatives**

- Almost all riparian and aquatic resource values would continue to be inaccessible in WSR by motorized vehicle due to mixed ownership patterns, lack of public easements through private land, rugged topography, and steep or inaccessible river banks, which limit use to existing campsites and day-use areas and prevent pioneering of new user-created routes.
- No existing mining or oil and gas leases are located in these river canyons. Limiting future potential energy and mineral development to no surface occupancy within the river corridors of the John Day, South and North Forks of the John Day River would result in no effect to existing WSR ORVs and the ORVs of the North Fork John Day River.
- Development of recreation facilities would be allowed on public lands but would be required to comply with State Scenic Waterway regulations, which allows development only if screened by topography and/or vegetation.

### **Visual Resource, Wild and Scenic River, and Resource Use Effects on Wild and Scenic Rivers**

Under the action alternatives, the WSR Eligibility determination would provide adequate protection to the North Fork John Day River's free-flowing character and its ORVs. Protective management to the fishery, scenery and recreation ORVs of the North Fork John Day River would provide adequate protection of these values, subject to valid existing rights. Management activities and authorized uses would not be allowed to adversely affect either eligibility or tentative classifications.

### **Visual Effects on Wild and Scenic Rivers**

Under Alternative 1, VRM classes for public lands in the plan area would continue to provide protection of scenic ORVs on public lands within existing designated WSRs.

The scenery ORV would receive additional protection and enhancement through existing State Scenic Waterway scenic regulations limiting or prohibiting activities that reduce scenic quality on public and private lands within 0.25 mile on each side of a state-designated waterway. Protection of scenic quality under State Scenic Waterway regulations would continue on the main stem John Day River and the North Fork and South Fork John Day Rivers, which are State Scenic Waterways. Under Alternatives 2 and 5, potential Congressional designation of the North Fork John Day River as part of the national Wild and Scenic River system (with a potential classification as scenic) would provide a level of protection to the scenery and fisheries outstandingly remarkable values in addition to the protection already provided under the State Scenic Waterway classification as Accessible Natural River Area, and by the riparian strategy and the Endangered Species Act. The scenic ORVs of all existing Wild

and Scenic Rivers would continue to benefit from existing VRM Class II management on public lands next to 195 miles of WSR on the main stem John Day River and the South Fork John Day River. The Scenery ORV of the North Fork John Day River would be protected and enhanced and would benefit more under the action alternatives than the No Action Alternative due to their higher retention of natural landscapes on public lands within this 37-mile river segment. This enhancement is due to VRM Class II management objectives requiring that any changes in any of the basic elements (form, line, color, texture) caused by a management activity not be evident in the characteristic landscape.

Alternatives 2 and 5 would be the most consistent of the alternatives with the existing State Scenic Waterway classification of this segment of the North Fork as an Accessible Natural River Area. Under State Scenic Waterway regulations, the emphasis of this state river classification is to retain existing visual quality while allowing road access.

Under Alternative 3, the effects of other activities on Wild and Scenic Outstandingly Remarkable Scenery values would be the same as Alternative 2, with the following exception. If designated as a Wild and Scenic river under this alternative, the recreational classification on public lands from Camas Creek to Mallory Creek would be managed similar to the Scenic classification for this river segment under Alternative 2, but this alternative would provide more flexibility in how all public uses are managed and allow a higher level of recreation development than Alternative 2. For example, recreation development such as campsites, campgrounds and day-use areas may be more apparent and not blend into the landscape as well as these developments would under Alternative 2, with a Scenic classification.

Alternative 4 would provide much of the same protections of visual ORVs as the other action alternatives due to the existing protections already provided by the State Scenic Waterway designation of the North Fork as an Accessible Natural River Area and the VRM II allocation. However, no federal interim protection of the scenic values associated with a suitability recommendation would occur.

The effects of Alternative 5 would be the same as Alternative 2.

### **Recreation Opportunities Effects on Wild and Scenic Rivers**

Under Alternative 1, existing recreation ORVs would continue to be protected by existing federal and State Scenic Waterway regulations.

Recreation ORVs would be protected through federal and state regulations providing protection of scenic quality, maintaining a scenic river canyon area for recreation activities such as rafting, fishing, and camping to occur.

Under Alternative 2, opportunities for increasing public awareness of the river ORVs and developing partnerships with adjacent landowners to protect and enhance the river ORVs would be enhanced if this river was designated as a Wild and Scenic River. The OHV limitations restricting motorized use to designated roads and trails would help protect scenic and fisheries ORVs by limiting motorized use to designated roads and trails. The recreation ORV would be protected and enhanced by managing OHV use to allow short- and long-term recreation use within this river corridor.

Designation of the North Fork John Day River as an SRMA would help increase funding to manage recreation use, while protecting and enhancing recreation ORVs.

Under Alternative 3, the effects of other activities on Wild and Scenic Outstandingly Remarkable Recreation values would be the same as Alternative 2, with the following exception. If designated as a Wild and Scenic River under this alternative, the recreational classification on public lands from Camas Creek to Mallory Creek would be managed similar to the Scenic classification for this river segment under Alternative 2, but this alternative would provide more flexibility in how all public uses are managed and allow a higher level of recreation development than Alternative 2.

Under Alternative 4, the effects of not recommending the 37-mile river segment of the North Fork John Day River eligible river as suitable for potential designation by Congress would result in not securing a guarantee of free-flowing character of the North Fork John Day River, provided as part of a federal Wild and Scenic River designation.

No federal interim protection of the recreation ORVs would occur. The existing protections already provided by the State Scenic Waterway designation of the North Fork as an Accessible Natural River Area, PACFISH, and ICBMP management guidelines would continue to provide a lower level of protection of river ORV values of the North Fork John Day River than provided under Alternatives 2, 3, and 5. Designation of VRM Class II on public lands within the North Fork John Day River would also have the same effects to the river ORVs as Alternatives 2 and 5. Limiting motorized use to designated roads and trails and designation of the North Fork John Day River as an SRMA would also have the same effects as Alternatives 2 and 5.

The effects of Alternative 5 would be the same as Alternative 2.

### **Fishery Effects on Wild and Scenic Rivers**

Under Alternative 1, existing fishery ORVs would continue to be protected by existing federal and State Scenic Waterway regulations. The Fishery ORV would continue to be protected through existing PACFISH and water quality regulations. The free-flowing character of the North Fork John Day River would not receive additional federal protection through WSR designation. However, other federal regulations (such as PACFISH), the Oregon State Scenic Waterway, and regulations of the ODFW and DEQ would help protect the free-flowing character of the North Fork John Day River.

Under Alternative 2, the Aquatic Conservation Strategy would provide additional protection to the fisheries and scenic ORVs over Alternative 1, by ensuring uses do not affect riparian and aquatic resources, through aquatic and riparian BMPs. If designated by Congress as a WSR, another important effect of recommending the North Fork John Day River eligible river as suitable for potential designation by Congress would result in securing a guarantee of free-flowing character of the North Fork John Day River, in perpetuity, as provided through federal Wild and Scenic River designation. The OHV limitations restricting motorized use to designated roads and trails would help protect fisheries ORVs by limiting motorized use to designated roads and trails. Designation of the North Fork John Day River as an SRMA would help increase funding to manage recreation use, while protecting and enhancing recreation, scenery, and fishery ORVs.

Under Alternative 3, the effects of other activities on Wild and Scenic Outstandingly Remarkable Fisheries values would be the same as Alternative 2.

Under Alternative 4, the effects of not recommending the 37-mile river segment of the North Fork John Day River eligible river as suitable for potential designation by Congress would result in not securing a guarantee of free-flowing character of the North Fork John Day River, provided as part of a federal Wild and Scenic River designation. No federal interim protection of the fishery ORVs would occur. The existing protections already provided by the State Scenic Waterway designation of the North Fork as an Accessible Natural River Area, PACFISH and ICBMP management guidelines would continue to provide a lower level of protection of river ORVs of the North Fork John Day River than provided under Alternatives 2, 3, and 5. The effect of Alternative 5 would be the same as Alternative 2.

### **Summary of Alternative Management Effects on Wild and Scenic Rivers**

Under Alternative 1, the North Fork John Day River would not be managed under BLM Manual 8351 to protect the identified ORVs. Existing BLM management would provide a lower level of protection of fishery, scenery, and recreation ORVs than Alternatives 2, 3, and 5.

Under Alternative 4, the North Fork John Day River would not be protected by BLM WSR interim management regulations—BLM Manual 8351. River ORVs would receive a lower level of protection through existing protections; however, there would be no guarantee of protection of free-flowing river character under this alternative.

## Cumulative Effects on Wild and Scenic Rivers

Potential negative impacts to scenic, recreation, and fisheries outstandingly remarkable values have resulted from past human activities such as logging, road development for timber and commerce through eastern Oregon, livestock grazing year round in riparian and upland areas, community development, and dams on some tributaries in the John Day River Basin. Prior to acquisition by the BLM, the majority of lands along the North Fork John Day River were logged, resulting in logging activities being visible upslope along both sides of the river.

These actions have had an effect on the ORVs of existing WSRs and also an effect on the ORVs of the North Fork John Day River. Current and expected future WSR management of ORVs in designated WSR segments of the John Day River and South Fork John Day River will continue to protect and enhance these ORVs by implementing management plan actions focused on the protection and enhancement of ORVs along these rivers.

Current and future protection of existing ORVs on the North Fork John Day River are expected to continue through proposed VRM Class II objectives for the river canyon, Aquatic Conservation Strategy, and the limiting of motorized use to designated roads and trails, which when combined, provide a higher level of protection than exists under the existing situation. State Scenic Waterway Accessible Natural River Area regulations will also continue to protect ORVs of the North Fork John Day River.

Although visitor use is expected to increase over the long term on all existing Wild and Scenic Rivers, the federal Wild and Scenic River designation would continue to provide the guarantee of short- and long-term, free-flowing water, free of water impoundment. Increased public awareness and an added layer of protection and partnership opportunities with adjacent landowners and user groups would occur with Wild and Scenic River designation. Additional funding may also result from WSR designation. These benefits would be expected to also occur on public lands along the North Fork John Day River, if Congressional action resulted in WSR designation for this waterway.

## Wilderness and Wilderness Study Areas

### Introduction

Under all alternatives, the BLM will manage Spring Basin Wilderness according to the Wilderness Act, BLM Wilderness regulations at 43 CFR 6300, the BLM's National Wilderness Management Policy, and specific provisions of the enabling legislation in the Omnibus Public Land Management Act of 2009 (Public Law 111-11), which ensure that management actions preserve or enhance the wilderness character of the area.

Analysis of the environmental consequences of the alternatives on Wilderness Study Areas considered the following key resources or resource uses: Fire and Fuels, Wildlife, Special Designations (WSAs, ACEC/RNA, and Back Country Byways), Livestock Grazing, Recreation Opportunities, and Travel Management.

Indicators used to compare environmental consequences between alternatives include: degree of protection of WSA values.

### Wilderness Study Area Assumptions

- Managing Wilderness Study Areas according to the Interim Management Policy for Lands Under Wilderness Review (BLM 1995), including regular WSA monitoring and work to deter, detect, report and rehabilitate any damage or impairment to WSAs, would maintain their suitability for designation.
- Projects proposed within a WSA such as prescribed fire (including fire to achieve resource objectives), riparian and wildlife habitat improvements, noxious weed control, wild horse management, and grazing improvements require a site-specific NEPA analysis in accordance with the IMP and must meet the "non-impairment criteria" in order to proceed.
- The Interim Management Policy provides specific guidance for managing most uses in WSAs, including commercial permits, OHV use, motorized vehicle use, livestock grazing, energy and mineral uses, and land use authorizations.

The following resources or resource uses would have no effect on Wilderness Study Areas: Soils, Air Quality, Vegetation, Aquatic Resources, Vegetation (special status plants and noxious weeds), Wild Horses, Lands with

Wilderness Characteristics, Cave Resources, Visual Resources, Special Designations (wild and scenic rivers and wilderness), Native American Uses, Paleontological Resources, Cultural Resources, Recreation Opportunities (facilities), Energy and Mineral Resources (leasable, locatable, and salable minerals), Lands and Realty (land tenure), Use Authorizations, and Agricultural Land Management.

## **Analysis of the Effects of the Alternatives on Wilderness Study Areas**

### ***Fire and Fuels Management Effects on Wilderness Study Areas***

Fire to achieve resource objectives and prescribed fire under the action alternatives may better improve ecosystem health in some WSAs than under Alternative 1. In accordance with the Interim Management Policy, mechanical juniper treatments are not permitted.

Managing fire within the full array of appropriate responses would meet the WSA objective of allowing fire to play a natural role whenever possible. Wildland fire is an important tool for improving ecosystem health within WSAs where mechanized tools are not an option. When managing fire in a WSA, minimum impact management tactics would be used and a Resource Advisor would be present during a wildfire to bring forward any concerns specific to the WSA.

### ***Wildlife Management Effects on Wilderness Study Areas***

Greater seasonal area closures for motorized vehicles under Alternatives 2-5 would close most existing motorized routes within WSAs during the winter season. There are currently few routes open to motorized use in WSAs, and some of these routes are already closed during the winter season to protect soils and road surfaces during muddy conditions. Current winter use of these routes is minimal, and some of the winter activities are illegal in nature, including unauthorized wood cutting and unauthorized cross-country vehicle use associated with horn hunting. Closing most of the remaining routes to motorized use under the action alternatives during winter months may help cut down on illegal activities, but would also close motorized access to legal users, requiring all users to travel within the WSAs by foot, horse, or boat during the winter season.

### ***Wilderness Study Area Management Effects on Wilderness Study Areas***

In all alternatives, WSAs would be managed in accordance with the Interim Management Policy to maintain their suitability for Wilderness designation by Congress. In addition, improving access to public information about WSAs and their management through various media including the BLM website will help visitors and neighbors understand which activities and uses are allowable in WSAs, hopefully resulting in decreased violations associated with unauthorized wood cutting and OHV use. The information will allow the public to identify WSA locations and boundaries, locate designated motorized vehicle routes on a map, plan ahead for a visit, know the regulations in advance, and contact the BLM with questions or to report a violation.

Establishing partnerships to assist the BLM with monitoring work would increase field monitoring presence, which is key to understanding where and how violations such as wood cutting and OHV use are taking place so they can be deterred and prevented. Informing the public about violations and seeking volunteers to assist with reclamation would help increase awareness of these management problems and challenge the public to become involved in solutions.

Inserting relevant IMP requirements (where applicable) into grazing lease agreements and recreation permit stipulations would clarify requirements for operating within a WSA, helping to reduce confusion and improve compliance.

Establishing partnerships to assist the BLM with monitoring work would increase field monitoring presence, which is key to understanding where and how violations are taking place so they can be deterred and prevented. Informing the public about violations and seeking volunteers to assist with reclamation would help increase awareness of these management problems and challenge the public to become involved in solutions.

### ***Contingent Allocations***

If Congress releases a Wilderness Study Area from further consideration as wilderness, these lands would no longer be managed according to the Interim Management Plan, but instead according to contingent allocations

specific to each Wilderness Study Area. For lands released from WSA status, changing the VRM Class from a VRM Class I to a VRM Class II would slightly reduce protections to the visual resources of these lands. Limited mechanical treatments to reduce juniper encroachment could be conducted on these lands.

Designating the lands within the existing North Pole Ridge, Thirtymile, and Lower John Day WSAs as the Lower John Day ACEC would protect the natural scenic values and primitive recreation opportunities associated with these lands.

Under the action alternatives, managing the lands within the existing Sutton Mountain WSA under the management proposed for the John Day Paleontology ACEC (see John Day Paleontology ACEC Alternatives in Chapter 2), and continuing to manage these lands under no-surface-occupancy requirements for oil and gas development and closed to wind energy development would better protect the natural scenic value of these lands. Continuing to limit motorized vehicle use to signed designated routes except for administrative use would help to maintain the primitive recreation setting and non-motorized travel emphasis identified for this portion of the Bridge Creek SRMA.

Under the action alternatives, managing the lands within the existing Pat's Cabin WSA under no-surface occupancy requirements for oil and gas development and closed to wind energy development would better protect the natural scenic value of these lands than under Alternative 1. Continuing to close these lands to motorized vehicle use except for administrative use would protect the highly erosive soils in this area and help maintain the primitive recreation setting and non-motorized travel emphasis identified for this portion of the Bridge Creek SRMA.

Under the action alternatives, managing the lands within the existing Aldrich Mountain WSA under no-surface occupancy requirements for oil and gas development and closed to wind energy development would better protect the natural scenic value of these lands than under Alternative 1. Continuing to limit motorized vehicle use to signed designated routes except for administrative use would help slow the spread of noxious weeds and maintain the primitive recreation setting and non-motorized travel emphasis identified for this portion of the South Fork SRMA.

Under the action alternatives, managing the lands within the existing Strawberry Mountain WSA as closed to motorized vehicle use, except for administrative use, would help protect the adjacent USFS Wilderness Area from motorized vehicle intrusions.

### ***ACEC/RNA Management Effects on Wilderness Study Areas***

Designating the 6,639-acre Black Canyon ACEC/RNA to be managed as a Research Natural Area (RNA) inside the existing Sutton Mountain WSA for the purpose of protecting native plant communities under the action alternatives would help to protect the special plant features identified for this WSA. The IMP takes precedence over ACEC/RNA direction unless the other management direction is more restrictive and protective than the IMP, in which case the more restrictive management would be followed. Under ACEC/RNA direction, livestock grazing would not be permitted within the RNA to protect the native plant communities for which the RNA is proposed.

Designating the John Day Paleontology ACEC that overlaps the Sutton Mountain WSA for the purpose of protecting paleontological resources would better protect the special paleontological features identified for this WSA under Alternatives 2-5 than Alternative 1. The primary reason for the ACEC is to ensure that these lands are recognized as containing significant paleontological resources and conserved for research and interpretation into the future as important components of a broader scientific and management approach that the BLM shares with the John Day Fossil Beds National Monument. The IMP takes precedence over ACEC/RNA direction unless the other management direction is more restrictive and protective than the IMP, in which case the more restrictive management would be followed.

### ***Contingent Designations***

Under the action alternatives, if Sutton Mountain WSA were released from consideration for wilderness by Congress, managing the Black Canyon ACEC/RNA and the John Day Paleontology ACEC according to the ACEC/RNA standards instead of the IMP would continue to offer protection for the natural scenic values of these

lands. Alternative 1 would not offer this level of management. The BLM would consider fencing and signing the perimeter of the RNA.

Under the action alternatives, if the North Pole Ridge, Thirtymile, or Lower John Day WSA were released from consideration for wilderness by Congress, designating these lands as the Lower John Day ACEC and managing them according to the ACEC/RNA and VRM Class II standards would continue to offer protection for the natural scenic values of these lands. Alternative 1 would not offer this level of management.

### ***Back Country Byways Effects on Wilderness Study Areas***

Under Alternatives 2-5, designating the Sutton Mountain BLM Back Country Byway or Scenic Byway would attract more visitors to the Sutton Mountain and Pat's Cabin WSAs, increasing the need for visitor information, Leave No Trace education, and WSA patrols to maintain wilderness values.

### ***Livestock Grazing Management Effects on Wilderness Study Areas***

In all alternatives, livestock grazing in WSAs may continue at the same level (number, kind, and class of livestock) as existed at the time of passage of FLPMA in 1976. Changes in livestock type or season of use and projects proposed within a WSA will be analyzed in a site-specific NEPA analysis and meet the requirements of the Interim Management Policy.

### ***Recreation Management Effects on Wilderness Study Areas***

#### ***Special Recreation Management Area***

Existing management goals identified for the John Day River SRMA to be continued in Alternative 1, plus management goals identified for additional SRMAs in Alternatives 2-5, including recreation management zones, would be consistent with the Interim Management Plan and the desired recreation setting for Wilderness Study Areas.

#### ***Recreation Permits***

Continuing the existing moratorium on new upland commercial permits in Alternative 1 would have no effect on WSAs. Discontinuing the moratorium in Alternatives 2-5 may increase the availability of new annual upland commercial permits in some WSAs, pending the results of site-specific NEPA analyses.

## **Native American Uses**

Under all alternatives, avoidance of traditional use sites that are identified by a recognized tribal government within the plan area would be the preferred and most common method to eliminate or reduce adverse impacts. However, if avoidance would not be possible, other impact reduction measures would be developed in consultation with the tribal government having an identified interest. Examples of such measures include timing the management action to occur during a period when traditional users are not present on the site, or timing the action to enhance a resource for future use, and permitting use of an alternative location acceptable to traditional users. In those instances when tribal governments would not be able to provide traditional use site locations in advance of projects, it would not be possible to take measures to protect a known resource of concern, because some impacts could occur at those locations and others unknown to BLM.

## **Paleontological Resources**

Indicators used to compare environmental consequences between alternatives include: paleontological resource localities, which are the basic unit of analysis for the purposes of fossil resource management.

**Paleontological Assumptions:** Paleontology resource localities would be located as a result of predisturbance inventories. The amount of damage to paleontology localities would vary little between all the alternatives. Under all alternatives, less than 1% of localities would be damaged per decade across the plan area.

Nearly all impacts to paleontological localities would be reduced or eliminated under all alternatives through the practice of pre-disturbance locality discovery methods over planned or permitted project areas and the application of avoidance or other protection measures on identified localities. However, locality avoidance would not always be possible which would result in incidental or inadvertent loss of localities or locality information. Examples include:

- Localities that cannot be entirely avoided by project redesign without eliminating the resource benefits provided by the project.
- Projects that cannot be relocated or redesigned. For example, a ridge saddle may be the only economic and engineering feasible location for an access road.
- Projects where the locality is not visible on the surface and remains unknown.

Localities are not evenly distributed across the landscape or across landforms. Although there are exceptions, most paleontology localities occur throughout the middle and upper stretches of the river basin (see Paleontology Resources, Chapter 3). There are 155 recorded paleontological localities within the planning unit.

Any ground-disturbing action, which includes timber harvest, fire and fuels management, recreation management, grazing and off-highway vehicle use, could damage or destroy paleontology resources (see the Paleontology Resources section of Chapter 3). Effects include:

- For road construction, no localities were reported damaged in the plan area so the damage rate is 0%.
- For fires and fuels management, no localities were reported damaged in the last 12 years per 12,700 treated acres annually on average in the plan area. Fire damage to fossil localities would be rare as most localities have no vegetation. Suppression activities related to wildfires have the potential to impact some localities, especially in vegetatively barren exposures that are used as fire line anchor points or safety zones.
- For recreation site development and use, no localities were reported damaged from implemented projects. However, it is assumed that locality damage would occasionally occur if recreation sites are placed near paleontological localities.
- Off-highway vehicle use that occurs on existing and designated roads does not directly impact paleontological localities. Use that occurs outside of existing and designated roads would damage paleontological localities. One recorded locality has been damaged as a result of off-highway or motor vehicle use outside of existing and designated roads.

Under the No Action Alternative, paleontological practices would be guided by existing laws and guidance. However, fuels/fire treatment acres would likely be reduced over time as large-scale treatments become less common. The reduction in large-scale projects would be due to the fact that large-scale areas were treated in the past and there would be fewer areas of such size available for such actions. Ground-disturbing hazardous fuels treatments would average 3,600 acres annually, for a total of 108,000 acres over the next 30 years. No paleontological localities have been damaged as a result of implemented fuel/fire treatments under existing management to date.

Under the No Action Alternative, damage to paleontological localities due to implemented road construction, recreational site development and use, and off-highway vehicle use would be minimal.

Under the action alternatives, paleontological practices would be the same as Alternative 1. Continued BLM support of the interagency agreement with the John Day Fossil Beds National Monument provides the BLM with professional and technical assistance, as needed, for the majority of fossil resources in the plan area and the best available information for landscape and site-specific planning decisions related to paleontological resources.

Continuing this relationship would be a continuation of existing practice within the plan area that is not specifically authorized by the existing RMP. The management of paleontological resources under the action alternatives makes an existing practice a land use plan decision.

Under all of the action alternatives, fuels and fire treatments would be conducted on an average of 5,900 acres annually and a total average figure of 177,000 acres for the next 30 years. If no localities were damaged as a result

of 12,700 acres treated annually over the past 12 years (a total of 152,409 acres) then we can assume that over the next 30 years, pre-disturbance surveys would continue to prevent effects on paleontological resources.

Under all alternatives, damage to paleontological localities due to implemented road construction, recreation site development and use, grazing development, and off-highway vehicle use on designated roads and trails would be minimal.

The John Day Basin Paleontology ACEC is proposed under the action alternatives (2-5). The proposed ACEC has limited restrictions due to the conflict between identifying the specific locations for planning purposes and the confidential nature of the locations. Most if not all potential impacts to the specific ACEC units can be dealt with through existing reviews and processes. The primary reason for the ACEC is to ensure that the selected ACEC units are recognized as significant and conserved for research and interpretation into the future as important components of a broader scientific and management approach that the BLM shares with the John Day Fossil Beds National Monument.

## Cumulative Effects

In the case of the planning area, much of the paleontological record occurs on public land. Through an interagency agreement, the BLM and National Park Service work cooperatively to identify and understand the distribution of fossil through the various geologic rock layers exposed on their respective lands. Private land fossils are incorporated when willing owners allow it. The cumulative effects of actions on private land have a limited impact on the management of fossil resources in the planning area.

## Cultural Resources

### Introduction

Indicators used to compare environmental consequences between alternatives include: isolates and sites (cultural properties consist of isolates and sites. Sites are the basic unit of analysis for the purposes of Section 106 of the NHPA [1966, as amended]).

**Cultural Resource Assumptions:** Cultural resource sites would be located as a result of predisturbance inventories. The amount of damage to cultural sites would vary little between all the alternatives. Under all alternatives, less than 1% of sites would be damaged per decade across the plan area.

### Effects of Alternatives on Cultural Resources

Nearly all impacts to cultural sites would be reduced or eliminated under all alternatives through the practice of pre-disturbance site discovery methods over planned or permitted project areas and the application of avoidance or other protection measures on identified sites. However, site avoidance would not always be possible which would result in some incidental or inadvertent loss of sites or site values. Examples include:

- Sites that cannot be entirely avoided by project redesign without eliminating the resource benefits provided by the project.
- Projects that cannot be relocated or redesigned. For example, a ridge saddle may be the only economic and engineering feasible location for an access road.
- Sites where the values are dependent on the visual setting.
- Sites that are not fully identified prior to ground disturbing actions due to lack of surface manifestations or reduced surface visibility. For example, some sites are partially or entirely below the ground surface or surface artifacts are not visible during inventory due to dense ground vegetation and thick duff cover.
- Sites are not evenly distributed across the landscape or across landforms. As stated in Chapter 3, the majority of BLM land in the plan area occurs within the John Day River canyon where there exists a relatively narrow riparian zone and floodplain and steep to moderately sloping canyon walls. A smaller

portion of BLM lands in the planning unit exhibits upland topography (see Chapter 3, Map 17, and Table 3-1).

Data is available for 11 of the last 17 years (1990-2007) for the Prineville District including acres inventoried at the Class III (intensive) level, the number of newly discovered and recorded sites, and the number of sites damaged by implemented projects. The data is not totally specific to the planning unit only. However, district findings apply to the plan area and the number of sites that will be found in the future per acre inventoried and the number of sites damaged per project disturbed acre can be projected, as well as the correlations between site characteristics and environmental attributes, using the OHIMS database (below).

First, a total of 74,244 acres of Class III survey was completed for the District in the 11 years for which data is available. The number of acres inventoried for each year is unevenly distributed. Class III survey occurred in the other six years as well, so the total number of acres surveyed over the 17 years in the district is greater than 74,244. The total number of acres surveyed in the plan area, however, is estimated to be one-third again as small (roughly 50,000 acres).

Second, the number of sites recorded for the district for those 11 years is 803 sites. Again, the number of recorded sites would be higher if the figures were included for the missing years. The number of newly recorded sites each year is uneven. Currently, there are 439 sites recorded in the John Day basin. Not all, but most, of those sites were recorded in the period of time under consideration. Over the 11 years for which there is specific data, however, only one site was reported being damaged from an implemented project.

Any ground-disturbing action that includes timber harvest, fire and fuels management, recreation management, grazing and off-highway vehicle use could damage or destroy cultural resources (see the Cultural Resources section of Chapter 3). In summary:

- For road construction, no sites were reported damaged in the plan area so the damage rate is 0%.
- For fires and fuels management, only one site (0.23%) was reported damaged in the last 12 years per 12,700 treated acres annually on average in the plan area. Damage to one site does not provide enough data to develop a meaningful correlation between the number of acres treated and the risk of damaging cultural sites. However, it is assumed that damage to archaeological sites would occur occasionally. Fuel treatments also reduce the risk of wildfires damaging sites. While fuel treatments would reduce the risk of wildfires damaging sites, there is no quantified data on risk reduction.
- For recreation site development and use, no sites were reported damaged from implemented projects. However, it is assumed that site damage would occasionally occur.
- Off-highway vehicle use that occurs on existing and designated roads does not impact archaeology sites. Use that occurs outside of existing and designated roads could damage sites. No sites have been reported damaged by off-highway vehicle use within the plan area.

Under the No Action Alternative, archaeological practices will be guided by existing laws and guidance. Under this alternative (Alternative 1), fuels and fire treatment acres would likely be reduced over time as broad-scale treatments become less common. The reduction in broad-scale projects would be due to the fact that broad-scale areas were treated in the past and there would be fewer areas of such size available for such actions. Ground disturbing hazardous fuels treatments would average 3,600 acres annually, and average a total of 108,000 acres over the next 30 years. If only one site was damaged as a result of 12,700 acres treated annually over the past 12 years (a total of 152,409 acres), then we can assume that over the next 30 years only one site would be damaged.

Under the No Action Alternative, damage due to implemented road construction, recreation site development and use, and off-highway vehicle use would be unlikely to occur.

Under all of the alternatives, archaeological practices would be the same as the No Action alternative plus the use of the Oregon Heritage Information Management System (OHIMS) database. Continuing support for the OHIMS database would provide for systematic storage of standardized and comparative archaeological information and provide an efficient way to retrieve that information when needed. This would provide the best available data for landscape and site-specific planning level decisions related to cultural resources, particularly

as it relates to site significance and site management categorization. Supporting the OHIMS database would be a continuation of existing practice within the plan area that is not specifically authorized by the existing RMP. The action alternatives adopt existing practice for management of cultural resources, which enables the most efficient implementation of land use plan decisions, virtually imperative for analyses across landscapes of mixed ownerships and scattered tracts, to transcend BLM land-management patterns and analyze past land uses on a watershed scale.

Under the action alternatives, fuels and fire treatments would be conducted on an average of 5,900 acres annually and a total average figure of 177,000 acres for the next 30 years. If only one site was damaged as a result of 12,700 acres treated annually over the past 12 years (a total of 152,409 acres), then we can assume that over the next 30 years no more than two sites would be damaged.

Under the action alternatives, damage to archaeological sites due to road construction, recreational site development and use, grazing development, and off-highway vehicle use on designated roads and trails would be unlikely to occur.

## Cumulative Effects

The cumulative effects on public land cultural resources from actions conducted on private land are difficult to assess. From a general standpoint, public land archaeological resources are much better understood because they are identified, recorded and mitigated during pre-project inventories, as required by law. Private land projects do not require archaeological inventories in most cases. For this reason, much of what we know about the archaeological record comes from public land resources. The adjacent National Forest has the same legal obligation as public lands and should also contribute to the base of knowledge in this area. As stated elsewhere in the document, the lands administered by the BLM occur in selective geographic areas of the planning area, producing a skewed picture of site distribution. For example, in the northern portion of the planning area, the majority of the public land consists of steep canyon walls and a narrow valley bottom. Upland areas are not well represented, which would likely have more possibility of resources.

## Livestock Grazing

### Introduction

Analysis of the environmental consequences of the alternatives on livestock grazing considered the following resources or resource uses: Vegetation (vegetation treatments, including fire management and noxious weed actions, and agricultural land management), Wildlife, Lands with Wilderness Characteristics, and Special Designations on permitted use.

Permitted use was the indicator used to compare and assess these effects. Permitted use [defined as amount of forage, expressed in animal unit months (AUMs), allocated by a land use plan for livestock grazing in an allotment under a lease] was chosen as an indicator because it is assumed to be the primary unit of value provided by this resource use that directly impacts local economies. While management actions (e.g., grazing schedules or fence construction specifications) may cause livestock operations to vary practices, such modifications are assumed to be inconveniences compared to a decrease in the value of the lease.

### Livestock Grazing Assumptions

- Vegetation treatments will require an average of two years of rest from livestock grazing following implementation. Prescribed fire treatments will also require one year of rest prior to treatment.
- Few vegetation treatments will correspond exactly to pasture or allotment boundaries requiring three times more area than the area treated to be rested from livestock grazing.
- Since forage production varies with location and vegetation treatment locations have not been specified, a basin-wide production of 15 acres per AUM was assumed for analysis purposes.

- All vegetation treatments will increase forage quantity and quality, but the additional forage would generally be allocated to wildlife. The additional forage could be allocated to livestock on a temporary non-renewable basis for which site-specific analysis would be performed.
- As agricultural lands are converted to native vegetation, the use of those lands will shift from cultivation to livestock grazing. Since forage production varies with location, for converted agricultural lands a basin-wide production of 7 acres per AUM will be assumed for analysis purposes.
- For analysis purposes only, 100% of applicable permits are assumed to be relinquished.
- In all alternatives, allotment monitoring, evaluation, and Land Health assessments (and subsequent site-specific analyses) may result in changes in forage allocation, season of livestock use, and construction of new fences, pipelines, and other range developments to meet resource goals and objectives.
- Grazing preference applications for areas with no active preference will continue to be evaluated according to direction provided in 43 CFR 4100 and, for Alternatives 3, 4 and 5, the grazing matrix.
- Reduced AUMs mean lessees must reduce herd size, lease other pasture, or decrease the amount of time they graze livestock on public land, or place more grazing pressure (more animals for longer time) on their private land.
- The Standards for Land Health provide a system to monitor and assess range conditions and make changes to the individual grazing systems, including the timing, intensity, and season of use. Since this plan does not propose changes in livestock grazing intensity or season of use and existing guidance (Standards for Land Health, Clean Water Act, others) directs the BLM to assess and change management to address problems, the ecological effects of livestock grazing are generally not reviewed in this plan.
- Objectives for the livestock grazing program management include reducing conflicts. In the Chapter 2 Livestock Grazing section, 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 greater the conflict, the higher the management costs for both the lessee 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.
- Alternative 1 assumes that existing guidance would adequately solve conflicts, and that grazing lessees, adjacent private landowners, recreationists, and other public land users can make adjustments as needed to lessen or resolve conflicts. In Alternatives 2-5, the assumption is that existing guidance does not go far enough in solving conflicts, and in some areas the preferred solution is to discontinue livestock grazing.
- In Alternatives 3-5, the definition of conflict includes an ecological conflict criterion. This criterion does not replace existing guidance (e.g., Standards for Land Health), which adequately directs 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.
- Effects of Alternatives 3-5 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.
- 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 reevaluated during the next planning cycle.
- Lessees 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. Lessees' 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 lessee can easily or 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 pastures or feed sources.
- Actual effects will be dependent on the private business decisions made by individual lessees based on their individual circumstances. A lessees' ability to withstand AUM losses depends on his reliance on

Federal forage. Reliance is high when lessees' private land acreage is low, or their ability to haul livestock to alternate pastures is low.

- We do not know the lessees' dependence on federal forage, so we do not know how AUM losses would affect individual lessees' overall grazing operation. A high dependence would make it more likely that AUM losses would cause lessees to cease grazing altogether, perhaps even selling their private property if the only income came from livestock grazing. Lessees with low dependence on federal forage could more easily absorb AUM losses with no change to their overall grazing operation. Most forage reductions would not take place unless grazing lessees voluntarily relinquishes their permit. This is assumed to reduce effects on the individual lessee, though the impact on the local economy would be the same as if the closure were forced. 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 is 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."

## Livestock Grazing Management Summary

This section outlines the effects anticipated on the grazing management program for each of the alternatives. Table 4-21 "Grazing Alternatives Results" summarizes the permitted use, expressed in animal unit months (AUMs), available in the plan area for the current situation and for each alternative. The AUM figures shown for Alternatives 2-5 assume that 100% of applicable grazing leases are relinquished.

**Table 4-21. Grazing Alternatives Results (AUMs).**

Category	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Open	27,148	5,578	11,454	10,883	11,308
Close	3,268	24,838	18,962	19,533	19,108

Alternative 1 results in the largest number of acres and AUMs remaining available for livestock grazing, while Alternative 2 results in the lowest—about 80 percent less than Alternative 1. The potential contribution to local livestock sales is correspondingly greatest in Alternative 1 and least in Alternative 2.

The potential long-term effects of anticipated forage reductions on individual lessees would be lowest in Alternative 1 and highest in Alternative 2. Conflicts between livestock grazing and other uses on public and adjacent private land are less likely in Alternative 2, which has the fewest acres open to grazing. Alternatives 3, 4, and 5 are likely to have conflict levels somewhat higher than those expected for Alternative 2.

## Effects of the Alternatives on Livestock Grazing

Analyses described herein focus only on actions where there is a measurable environmental consequence. Actions for the following resources and uses would have no measurable effect on livestock grazing: Soils, Wildlife, Wild Horses, Lands with Wilderness Characteristics, Cave Resources, Visual Resources, Special Designations, Native American Uses, Paleontological Resources, Cultural Resources, Recreation Opportunities (commercial recreation uses), and Lands and Realty at the planning scale.

Actions for the following resources and uses would have no effect on livestock grazing if associated assumptions are correct:

- Air Quality—Restrictions on operations, such as prescribed fire, are assumed to have no effect on vegetation treatment size, frequency, or the amount of rest required before or after such treatment.

- Water Quantity and Quality; Fish—Meeting aquatic resources goals is assumed to be achievable through modifying grazing practices (i.e., accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing) and would not require a measurable loss of permitted use.
- OHV and Travel Management—Management would not open or close public access to any range allotment and is therefore assumed to have no impact on the grazing matrix or permitted use.
- Special Designations—The potential for changes in grazing systems and seasons of use exist, but most necessary changes to livestock management have already been implemented and no major future actions would be anticipated.
- Energy and Minerals—Land allocations to energy and mineral-related activities are assumed to exclude grazing from a small enough acreage to have no measurable impact to permitted use.

## **Vegetation, Fuels, and Fire Management Effects on Livestock Grazing**

Under Alternative 1, an estimated 2,300 acres would be rested each year to prepare for a prescribed burn. In addition, 3,600 acres would begin the first of two years of rehabilitation each year. That would translate to approximately 1,900 AUMs being taken out of production each year, or 6.2% of the AUMs on public lands in the planning area. The use of prescribed fire and rehabilitation of wildfires could result in a long-term increase in forage quality and quantity after these sites recover. However, this increase would normally be allocated to improving ecosystem function and not to permanent increases in the amount of permitted use. Fire would cause a decrease in forage available for livestock use in the short term, requiring changes in livestock grazing use. Short-term impacts of emergency fire rehabilitation include grazing exclusion following the rehabilitation.

Under Alternatives 2-5, there would be 2,300 acres rested each year to prepare for a prescribed burn. However, another 4,400 acres would begin the first of two years of rehabilitation. Additionally, an estimated 1,500 acres would receive appropriate response treatment each year. That would translate to approximately 2,820 AUMs being taken out of production each year, or 9.3% of the AUMs on public land in the John Day Basin. This is 33% greater than Alternative 1.

## **Agricultural Land Management Effects on Livestock Grazing**

An estimated 700 acres of irrigated agricultural fields have been or would be converted under current management direction (Alternative 1). So far, no AUMs have been added to livestock grazing leases. However, if applications for grazing were made, the potential would exist for an additional 100 AUMs of preference to be allotted.

Under Alternatives 2–5, an estimated 1,175 acres of irrigated agricultural fields remain under production. If all this acreage were converted to native vegetation and applications for grazing all were made, the potential would exist for an additional 168 AUMs of preference to be allotted.

## **Cumulative Effects on Livestock Grazing**

Livestock grazing is historically important in the planning area both culturally and economically, although the contribution from BLM-administered public land is small relative to total cattle/calf production. 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 would 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). Livestock grazing on surrounding National Forests has experienced increased environmental scrutiny. Many lessees hold Forest Service permits as well. The loss of permitted AUMs on Forest Service land could increase demand for BLM AUMs in some cases and reduce the demand in others. The availability of interested lessees is likely to decrease through time due to the reduction of federal AUM availability,

the potential for permit/lease buy-outs, and the purchase of many large ranches in the basin by absentee owners that are not dependent on livestock production as a sole source of income. Based on this assumption, many range improvements would not be maintained without a concerted effort by the BLM and/or partnerships that through time would make it less likely that a lessee would be able to economically utilize allotments.

## Recreation Opportunities

### Introduction

Analysis of the consequences of the alternatives on recreation opportunities considered the following key resources or resource uses: Vegetation (management), Aquatic Resources, Wildlife, Visual Resources, Special Designations, Cultural Resources, Recreation Opportunities (recreation management), Travel Management, and Energy and Minerals.

### Recreation Indicators

- **Recreation experience quality** is indicated by a recreationist's level of satisfaction with their recreation experience. Setting conditions, frequency of encounters with other recreationists, and degree of similarity or conflict with other recreationists encountered are factors that affect satisfaction. Increasing the perceived naturalness of the landscape frequently increases the quality of the recreation experience.
- **Quantity of Recreation Opportunities.** Indicators for recreation supplies include the number of settings or sites, total trail or route distance, prescribed visitor capacities at particular sites, or amount of total area or length of time available for various types of recreation. Recreation opportunities are described on a spectrum from primitive to rural using setting attributes such as remoteness, naturalness, level of recreation technology, levels of site improvements, facilities and managerial intervention, and number of encounters with other recreationists.
- **Visitor Displacement** occurs when setting conditions or changes cause visitors who might otherwise recreate in the setting to either leave temporarily or stop using it altogether. Setting changes include the presence and activities of other recreationists (e.g., crowding or dissimilar recreation activities), level of managerial intervention or site modification, effects on the setting from non-recreation uses, and other factors. Displaced visitors indicate either short or long-term loss of recreation opportunity options.

### Recreation Assumptions

- The goal of recreationists using BLM lands is to obtain satisfying experiences through recreational activities in attractive natural settings.
- BLM managers have two goals when managing recreation: (1) provide opportunities for people to obtain satisfying recreation experiences and (2) minimize the impacts of recreational use on natural resources.
- Alternatives 2–5 would help meet future demand for regional non-motorized, motorized, and river-based recreation activities and improve the quality of most visitor experiences on public lands in the plan area.
- Nationwide, OHV sales and participation in OHV recreation peaked and began to decline in 2003/4 after years of rapid increases, but OHV use remains very popular, especially in rural areas adjacent to public lands (Cordell and others 2008). Demand for OHV access in the plan area will likely remain significant, at least in the near term and especially during hunting season. Demand for non-motorized recreation (e.g., viewing and studying nature, photography, bird watching, and wildlife viewing) may gradually increase for activities popular with retiring "baby boomers."
- Demand for river-based recreation may gradually increase, especially in spring and early summer when river flows most conducive to boating coincide with warmer weather.
- Nearly all public land visitors use vehicles to get to their preferred settings. For some visitors, their vehicle is just the mode of transportation used to access their recreational settings. For others, vehicle use itself is the recreational activity.

- In Alternatives 2–5, OHV use is limited to designated routes and trails, unless otherwise noted (Executive Orders 11644 [37FR2877] and 11989).
- Public lands classified as Middle Country may have some trails designated for non-motorized use only (see Tables 2-12 and 2-25).
- Not all public land can be legally accessed by the public (i.e., Federal lands that are landlocked by private landowners without any public access routes or easements).
- To the extent possible, BLM will utilize existing interim routes and will only build new route or trail connections if necessary to provide a variety of motorized and non-motorized designated route or trail loops as part of the Transportation Management Plan (to be completed 5 years following the ROD).
- BLM would enforce the 2007 43 CFR 8343.1 – Vehicle Operation Standards (October 1, 2007 edition, p. 946)—for OHV use on public land that identify sound, spark arrestor, light, brake, and other requirements for use of OHVs on public land.
- Allowable sounds from Class I, II, or III (see glossary) OHV use on public land would be limited to the Oregon state 99 decibel (db) limit. Under Alternative 2, allowable sound emissions from individual OHVs used at Little Canyon Mountain would be limited to 96 decibels.
- Sound from OHV use may be heard at different levels by other recreationists, adjacent landowners, lessees, permittees, mining claimants, other users, or wildlife. Noise (unwanted sound) from OHV use is variable and dependent upon, but not limited to type of OHV, riding or driving style of the OHV user, time of day, wind velocity and direction, topographic and vegetative screening, elevation, aspect, temperature, and other factors.

Table 4-25 is a plan area wide summary of alternative effects on motorized and non-motorized recreation opportunities and development on all public lands except Little Canyon Mountain. Table 4-26 is a Little Canyon Mountain summary of alternative effects regarding motorized and non-motorized opportunities and development, and Table 4-27 summarizes all recreation effects in general. Effects of the alternatives on Recreation Permitting are addressed in a separate, subsequent section.

## **Analysis of the Effects of the Alternatives on Recreation Opportunities**

### **Recreation Management Effects on Recreation**

Outdoor recreation provides a wide range of benefits to individuals, social groups and society. But recreational use also impacts public lands. These impacts accumulate over time at rates that vary with different recreational activities. Without proper management, recreation use can degrade or even eliminate the qualities of public land settings upon which recreationists depend to achieve satisfying experiences. Degraded recreation settings reduce the flow of recreation benefits back to individuals, social groups and society. Thus, public land recreation managers have two primary goals: (1) to provide opportunities for people to obtain satisfying recreation experiences, and (2) to minimize the impacts of recreational use on natural resources.

Not all recreation activities have equal environmental and social effects on recreation settings, nor are they equally compatible with one another or with non-recreation resource uses and values. Thus, to achieve an optimal balance between the sometimes competing goals of recreation access and resource protection, it is necessary to account for differences among recreation activity types (Table 4-22). These differences affect relative per capita resource impacts that popular forms of wildland recreation incur in recreation settings and help guide decisions regarding where each kind of use can be accommodated, visitor capacity, amount of trail needed for a quality experience, and the level of site hardening and mitigation necessary to protect resources.

The following sections discuss how recreation management actions in the alternatives may influence the kinds, quality, amounts and distribution of recreation opportunities that would be provided within the Planning area. Tables 4-24, 4-25, and 4-26 summarize relative differences in effects of the alternatives on recreation opportunities.

Environmental effects of recreation use and mitigation actions are also addressed when these significantly influence recreation settings and opportunities. Environmental effects are important to consider even in areas that currently see light use because if use patterns change, impacts can quickly accumulate that persist for years or

Table 4-22. Comparison of Effects of Popular Ground-based Recreation Activities.\*

Factors of interest to resource managers	Recreation Activity				
	Hiking/backpacking, trail running	Horseback riding, horse-packing	Mountain biking	Motorcycle riding (off-pavement)	4-wheeled OHV riding
<b>Weight applied to physical and biological setting (affects soil compaction potential)</b>	Weight of hiker, +up to 60 lb pack on extended trips	Weight of rider, +pack ≈100 lbs, +horse ≈900–1,200 lbs	Weight of rider, +day pack, +bicycle ≈25–40 lbs	Weight of rider, +motorcycle ≈175–275 lbs +any extra gear or supplies	Weight of rider, +OHV ≈400–800 lbs +any extra gear or supplies
<b>Power applied to physical and biological setting (affects soil displacement potential)</b>	1 “human power”	1 horsepower	1 “human power”	25–55 horsepower	30-60 horsepower
<b>Estimated speed range (can affect wildlife, other recreationists, distance traveled)</b>	2–4 mph walking/hiking ≈10 mph running	3–5 mph	5–25 mph, mostly slower uphill, can be quite fast downhill	Typically 15–35 mph Capable of 70 mph+ Varies with trail/road conditions	Typically 10–30 mph Capable of 70 mph+ Varies with trail/road conditions
<b>Daily trip length (est.)</b>	1–10 miles	4–15 miles	10-30 miles	25–50 miles	25–50 miles
<b>Vehicle track width Trail tread width (min.)</b>	12–24 inches	18–36 inches	≈4 inches 18–24 inches	≈6 inches 24 inches	≈48 inches 50-60 inches (one-way trails)
<b>Interface with, and effects on physical and biological setting</b>	2 lug sole hiking boots, may use 1–2 trekking poles. Footfalls, pole tip placements	4 horse hooves, can apply locally heavy impacts and pressure to trail substrate	2 tires ≈3” wide, ≈4” track, roll across terrain. Can lose traction/skid under power or braking, especially on slopes or in corners	2 tires ≈5” wide, ≈6” track, roll across terrain. Can lose traction/skid under power or braking, especially on slopes or in corners	4 tires 7–12” wide, ≈48” track, roll across terrain. Can lose traction/skid under power or braking, especially on slopes or in corners
<b>Emissions and waste products</b>	Human waste if not managed properly. Potential for litter/garbage/fire rings	Human waste if not managed properly. Potential for litter/garbage/fire rings Horse dung and urine	Human waste if not managed properly. Potential for litter/garbage/fire rings	Human waste if not managed properly. Potential for litter/garbage/fire rings Exhaust gases (CO, CO <sub>2</sub> , NOX), potential for spilled or leaked fuel and lubricants Motor sounds	Human waste if not managed properly. Potential for litter/garbage/fire rings Exhaust gases (CO, CO <sub>2</sub> , NOX), potential for spilled or leaked fuel and lubricants Motor sounds

\* These factors affect relative per capita resource impacts that popular forms of wildland recreation incur in recreation settings. These factors also help guide decisions regarding where each kind of use can be accommodated, visitor capacity, amount of trail needed for a quality experience, and the level of site hardening and mitigation necessary to protect resources.

even decades (Ouren *et al.* 2007). The environmental effects of different recreation activities ultimately impact the quality, types, and amount of recreation opportunities that the BLM is able to provide.

### **Recreation Conflict**

Conflict could occur between recreationists if the behavior or activities of one interfere with the goal of another to achieve a satisfying recreation experience (Manning 1999). One outcome of conflict is displacement, which occurs when visitors who might otherwise recreate in an area either leave temporarily or stop using it altogether. Conflicts that occur between non-motorized and motorized recreationists can often be attributed to noise and other characteristics of OHV use such as vehicle speed or resource impacts. Even if OHVs are not present, past OHV use could cause conflict with non-motorized recreation use. This is from vegetation loss and erosion that degrades settings, which impacts scenic qualities and ecological values.

Most types of recreation uses are relatively dispersed across the planning area, and overall use levels are fairly moderate, with exceptions in some areas and at certain times of year. The off-highway vehicle use peaks during the hunting season. Recreation use is somewhat more concentrated in the North Fork, South Fork, and main stem of the John Day River and adjacent uplands. Recreation conflicts may not always be reported to agency staff and displacement of visitors due to conflict can be difficult to detect or monitor. But conflicts between motorized and non-motorized users are known to occur in big game hunting areas such as the North Fork John Day River and also in the South Fork John Day River, Little Canyon Mountain, Rudio Mountain, and Dixie Creek areas. As recreation use overall increases across the planning area, instances of conflict and visitor displacement could also be expected to increase.

Conflicts would occur under all alternatives, but would be reduced under Alternatives 2-5 through better differentiation of settings and improved management of different activity types. Existing or potential conflicts between motorized and non-motorized recreationists would be mitigated primarily by zoning, or separating the two kinds of activities. Non-motorized recreationists usually have relatively low impacts on motorized recreationists so, as a rule, non-motorized activities are allowed in motorized recreation areas. However, non-motorized recreationists may avoid areas where significant motorized use occurs. Conflicts between motorized and non-motorized recreationists on the Rudio Plateau would be lowest under Alternatives 4 and 5, which do not allow cross-country OHV travel there, but these alternatives would also impact motorized recreationists the most by leaving them without any extensive open areas over which to drive their vehicles.

Conflict could also occur between recreationists and non-recreation resource uses such as livestock grazing, timber harvesting, or energy development. These activities can degrade recreation setting and experience quality, displace recreationists from areas they might otherwise use, and reduce the total amount of available recreation opportunities. The level of potential conflict between recreation and non-recreation uses varies with recreation activity, the kind and intensity of resource use, and the characteristics and tolerance of individual recreationists.

There also could be conflict when recreationists cross public land boundaries and trespass onto private lands. Fewer conflicts and trespass are expected to occur under Alternatives 2–5 than Alternative 1, due to OHV use restrictions that limit motorized use primarily to designated routes and trails on BLM lands or lands for which BLM has obtained a right-of-way for this use.

Conflict can also occur when recreation use on public land impacts adjacent private landowners, even though physical trespass may not be occurring, such as when OHV noise emanates from public land onto private. Conflicts of this type associated with OHV use at the “Pit” areas on Little Canyon Mountain have occurred in the past, and are addressed differently under each action alternative. Off-highway vehicle use has occurred on BLM lands in the Little Canyon Mountain area for an extended period of time, during which housing has continued to be developed on adjacent private lands. Alternative 5 would reduce conflict between OHV users and adjacent landowners at Little Canyon Mountain the most by precluding all OHV use in the “Pit” areas. But this would also impact OHV users the most by displacing them from a place they have been accustomed to using for some time. Compared to Alternatives 1 and 5, Alternatives 2, 3, and 4 represent a range of intermediate actions to balance the preferences of adjacent private landowners with the preferences of public land OHV recreationists at Little Canyon Mountain.

Under all alternatives, the chances for conflict would be greatest during weekends, holidays and hunting seasons. Alternative 1 does not offer conflict resolution criteria. Alternatives 2-5 use Benefits-based Recreation Criteria (Table 2-10) and other guidelines to reduce user conflict.

### **Special and Extensive Recreation Management Areas**

An SRMA designation intensifies management of BLM land areas where recreation is a high priority. It helps direct recreation program funding and personnel toward areas with high resource values, significant amounts of recreational activity, or elevated public concern. Areas with an SRMA can be expected to see investments in recreation facilities and visitor services aimed at reducing resource damage, mitigating user conflicts, and improving the quality of visitor experiences. SRMAs may have Recreation Management Zone (RMZ) subunits that are managed for distinct types of recreation experiences within a single SRMA. Any recreation facilities, site improvements, or resource protection actions would be consistent with, and would not change the recreation setting character defined for each RMZ, as described in Appendix K.

Each alternative includes the existing John Day River SRMA. Alternatives 2-5 would expand the John Day River SRMA and designate new SRMAs for Little Canyon Mountain, Bridge Creek, North Fork John Day River, and South Fork John Day River. Together, these five SRMAs would encompass 294,580 acres (64% of public lands in the plan area) and would be managed for different types of recreation opportunities and experiences as appropriate for specific areas.

Under Alternatives 2–5, the levels and types of recreation access and use across the plan area would vary based on differentiation of settings in these five SRMAs, providing more focused water-based, motorized and non-motorized management emphasis. Greater specificity and management focus on prescribed setting character and associated activities would increase the quantity and quality of recreation opportunities available for all recreationists compared to Alternative 1.

Under Alternatives 2–5, a variety of designated routes and trails enhance the spectrum of distinct recreation opportunities and the quality of experiences, and also help meet future recreation demand. Designated routes and trails would be developed, including loop routes, to help reduce user conflicts through separation of motorized and non-motorized uses in some areas and shared use on designated routes and trails in other areas. An ERMA is an area outside of an SRMA that emphasizes traditional dispersed recreation, with undeveloped character and a lower level of management intervention. These areas may include developed and primitive recreation sites with minimal facilities. Designation of the 59,163-acre Rudio Mountain/Johnson Heights and 2,516-acre Dixie Creek ERMAs would result in higher quality motorized and non-motorized activities by increasing resource protection, improving public safety, and reducing user/landowner conflicts in those areas compared to Alternative 1 (see Appendix K for additional details regarding each SRMA).

### **River-Based Recreation**

The BLM would continue to manage river use in all John Day River segments to provide quality river-based recreation. Recreation use in some river reaches and at certain times of year may reach levels that trigger Limits of Acceptable Change management actions. Upland recreation opportunities within the John Day River canyon area would continue to provide quality hiking, hunting, photography, and backcountry navigation opportunities. The quality of these river-based recreation opportunities would be the same under all alternatives.

All alternatives would carry forward existing recreation site developments on BLM-managed lands. Existing developments along the main stem John Day River would continue to support current and future, river and land-based recreation use, enhancing water-based and upland recreation opportunities within this river corridor.

Under Alternatives 2–5, the existing John Day Wild and Scenic River SRMA would continue to provide quality non-motorized and motorized recreation opportunities. Recreation facilities along the John Day Wild and Scenic River would continue to be upgraded to protect resources. A new semi-primitive campground may be developed on the south side of the John Day River at Priest Hole (north of Mitchell) and possibly a semi-primitive campground on the South Fork John Day River. These developments would provide more desirable locations for camping and day-use. Two semi-primitive campgrounds may also be developed on the North Fork John Day

River, providing additional camping and day-use opportunities in this area. The seasonal use restriction from April 15–November 30 annually would not affect most visitors.

Under Alternatives 2–5, prohibiting cross-country OHV use in the John Day riverbed during low flows would displace those OHV users who are accustomed to this access. However, non-motorized recreationists, riparian resource, and water quality values would benefit from this OHV closure.

Under Alternatives 2-5, the quality of recreation opportunities and experiences would be higher for all types of recreation currently provided for, compared to Alternative 1.

Under Alternatives 2 and 5, the North Fork John Day River would be recommended for designation as a Wild and Scenic River with all 37 miles of the designated reach classified as “Scenic.” Under Alternative 3, there would be 18 miles recommended for “Scenic” and 19 miles recommended for “Recreational” classification, which allows for more motorized access and development along the river than “Scenic.” If the North Fork John Day River is designated Wild and Scenic, motorized recreation access and opportunities would be greater and the setting character would be less primitive along 19 miles of the river under Alternative 3 than under Alternatives 2 and 5. Boaters on the river would likely see more evidence of human use and hear more motor sounds under Alternative 3 than under Alternatives 2 and 5. Under Alternative 1, the decision to recommend Wild and Scenic designation would be deferred. Under Alternative 4, the river would not be recommended for Wild and Scenic designation so outstandingly remarkable recreation values specific to the river might not be protected, but there would be fewer restrictions on motorized recreation on adjacent lands.

### ***Non-Motorized Recreation Opportunities***

As discussed here, non-motorized recreation may include the use of a vehicle for transportation to and from a recreation site, but while at the site, the vehicle is parked and not used during the recreation activity. For non-motorized recreationists, motor vehicle use is neither the primary focus nor an integral part of the recreation experience.

River-based non-motorized recreation activities in the planning area include rafting and drift boat floating, canoeing, kayaking, and boat- and shore-based fishing. Land-based activities include picnicking, day hiking, backpacking, camping, mountain biking, bird watching, wildlife viewing and other forms of nature study, nature photography, and berry and mushroom collecting. Although many hunters utilize OHVs, a significant number do not for various reasons, including a preference for quiet hunting settings (e.g., wilderness areas), beliefs that OHV noise reduces the chance of finding game animals and can disrupt hunts, or concerns about what constitutes “fair chase.” Hunters who do not use OHVs in any way during their hunts, including retrieval of killed game, are defined as non-motorized recreationists.

Changes in OHV area designations from Open to Limited under the action alternatives are intended primarily to maintain and improve riparian, soil, vegetation, wildlife, and wilderness resources. However, these designation changes would also indirectly improve opportunities for quiet, non-motorized recreation by providing more areas where foot travelers, equestrians, and other non-motorized recreationists would not encounter OHVs traveling cross country. Non-motorized recreation opportunities would also improve as a result of better differentiation of recreation settings, more focused management, and separation of incompatible recreation activities to minimize conflict.

Only non-motorized recreation activities would be permitted in Primitive and Back Country settings on 134,454 acres under Alternatives 2, 3, and 5, and 142,465 acres in Alternative 4. Under Alternative 1, no acres would be designated Primitive and Back Country, so non-motorized recreationists could encounter OHV users in these areas, reducing non-motorized recreation experience quality and potentially displacing non-motorized visitors. Separation of motorized and non-motorized use in some areas under Alternatives 2-5 would reduce encounters between motorized and non-motorized visitors, improving non-motorized recreation experiences in the North Fork John Day River, South Fork John Day River, Bridge Creek and Lower John Day SRMAs.

Under Alternatives 2–5, OHV use would be subject to seasonal and year-round closures in some areas and otherwise mostly limited to designated routes and trails. Restrictions on OHV use such as these are generally motivated by resource protection concerns rather than explicit goals to improve non-motorized recreation. However, compared to Alternative 1, OHV restrictions under Alternatives 2–5 would result in additional

non-motorized recreation settings and experience opportunities. Compared to Alternatives 2 and 3, which allow cross-country OHV travel on 3,971 acres on the Rudio Plateau, there would be higher quality non-motorized recreation opportunities on the Rudio Plateau under Alternatives 4 and 5, which restrict OHV travel in this area to designated routes. Non-motorized recreation quality on Little Canyon Mountain would be highest under Alternative 5, which would close this area to all OHV use, compared to Alternatives 2, 3, and 4, all of which allow some degree of OHV use at Little Canyon Mountain.

Opportunities to develop non-motorized trails under Alternatives 2–5 would increase recreation opportunities for visitors seeking hiking, backpacking, wildlife and bird viewing, hunting, mountain bike or horseback riding, or berry or mushroom picking opportunities in areas not open to OHV use.

Non-motorized recreation visitors may be displaced, in the event of competition to ride or use the same trail, or if sounds from OHV use intruded on the quality of the desired non-motorized recreation experience. Hikers and horseback riders may also be displaced if no designated trails exist for their preferred use, or if OHV use and OHV sound increase in the future.

## **Motorized Recreation**

### ***Motor Sound in Recreation Settings***

Nearly all public land visitors use vehicles to get to their preferred settings. Some use a vehicle only for transportation to their recreation site where it is parked and not used during the recreation activity. For other visitors, vehicle use itself is either the primary recreational activity or an integral part of it (i.e., OHV-based hunting). In this document, “motorized recreation” means the recreational use of single-rider three- and four-wheeled all-terrain vehicles (Class I), larger 4x4 vehicles with capacity for a driver and one or more passengers and that may or may not be “street legal” (Class II), and motorcycles (Class III).

Sound is any change in air pressure that the human ear can detect, from barely perceptible to levels that can cause hearing damage. Sounds that are unpleasant, unwanted, or disturbingly loud are generally considered “noise” (Michael Minor & Associates 2008). When a sound is noticed in a recreation setting, people evaluate it in the context of past experiences and the activities in which they are engaged, then attach meaning to it and judge its appropriateness for the setting and situation. People are generally more tolerant of sound from vehicles used for transportation than of sound from vehicles used for motorized recreation.

Most public land recreation settings contain fairly low levels of natural ambient background sound. These baseline setting conditions are valued and commonly sought by recreationists. Higher natural ambient sound levels may result from temporary or long-term situational factors such as weather conditions (i.e., wind), moving water, or bird and wildlife calls. Because these sounds are naturally occurring phenomena, they are generally pleasing or not annoying to recreationists.

Motorized recreation adds motor sounds to natural ambient background sounds at levels that can be significant. Unlike natural ambient background sounds, sound from motorized recreation is often perceived as annoying by other visitors who hear it. The characteristics of motorized recreation sound are similar to conditions in urbanized areas that non-motorized recreationists are generally seeking to escape. Thus, the presence of motorized recreationists can reduce the quality of, or even preclude the type of experience that non-motorized recreationists seek. The presence of non-motorized recreationists generally has a much smaller effect on motorized recreationists (Manning 1999).

Research suggests that humans respond to noise in outdoor recreational environments based on a combination of physical and socio-psychological factors (Kariel 1990). In general, louder sounds are more annoying, but loudness alone is not a good predictor of annoyance. Higher frequency sounds are generally more annoying than lower-pitched ones. Rhythmic sounds such as those from engines, as well as sounds that are intermittent, tend to be more annoying than continuous ones.

People often visit outdoor recreation settings to escape urban noise, enjoy the generally low ambient sound levels and other sensory attributes of natural environments, and reduce stress. Sounds that interfere with these goals would be considered as annoying. In this context, motor sounds that may be detectable at great distances at low

levels may still provoke reactions. Conversely, where motor sounds are considered inevitable, quite high sound levels may be tolerated. Instances where sound intrusions are considered as bad behavior and preventable, such as a motorcycle joyriding in a campground, are considered particularly annoying. People are quite tolerant when sound is considered necessary or beneficial, such as a rescue helicopter. For sounds considered annoying, the degree of annoyance is greater in the evening than during the day and greatest at night. Evaluation of pleasing sounds is constant, regardless of time of day (Kariel 1990).

The distance at which OHV noise may be detected is quite dependent on situational factors, such as local topography, sound characteristics of the individual vehicles, existing ambient background sound, and number of vehicles traveling together. One study found that 83 decibels OHV sound was detectable at a distance of 6,200 feet in a “typical forest environment” (Harrison 1974). The characteristics of OHV sound vary depending on OHV type. Class II OHVs typically emit lower frequency sounds than Class I or Class III OHVs.

Factors that affect how sound propagates away from its source, and thus how loud it appears to a person who hears it, include:

- **Spherical spreading loss**—the loss of energy that occurs as sound waves spread over a larger and larger distance. With each doubling of distance, sound emanating from a point source decreases approximately 6 decibels. For example, an OHV emitting 96 decibels at 25 feet would register 90 decibels at 50 feet, 84 decibels at 100 feet, and so on. At distances of 1,500 feet or less, spherical spreading loss affects perceived loudness more than any other factor.
- **Atmospheric absorption loss**—occurs as sound passes energy to air molecules as it travels through the atmosphere. Atmospheric absorption loss varies with air temperature, humidity, elevation (air pressure), and sound frequency in very complex ways that make prediction difficult. Beyond 1,500 feet, atmospheric absorption loss affects perceived loudness more than any other factor.
- **Absorption by foliage and ground cover**—In outdoor environments, foliage absorbs some sound energy, as do porous ground surfaces. Absorption by foliage varies only slightly with different plant species. At distances of 75 feet or less, even very dense foliage absorbs a very little sound energy. At distances over 350 feet, there is no additional loss in sound energy due to foliage absorption. At greater distances, sounds propagate above the vegetation. The Federal Highway Administration provides for up to a 5 decibel reduction in traffic noise for locations with at least 100 feet depth of dense evergreen foliage (Michael Minor & Associates 2008).
- **Refraction**—affects sound energy at distances greater than about 350 feet. As sound waves encounter atmospheric conditions that slow them, such as cooler air, the waves “bend” (refract) in that direction. In daytime, this effect causes sound waves to bend upward when there is warm air near the ground and cooler air above it. At some distance from the bending waves, a shadow zone is created where the sound will appear less loud. At night, when air near the ground cools, sound waves from the same source may bend downward. In this case, the same sound level emission at the same distance would seem louder than during the day. Wind also refracts sound waves. For example, a person downwind from a sound source will perceive the sound as louder than a person upwind of the same source.
- **Diffraction**—occurs when sound energy is scattered after encountering a barrier. The amount of scatter depends on the amplitude and frequency of the sound, the size of the barrier, the distance from the sound source to the barrier, and the distance from the person perceiving the sound to the barrier. Within limits, the taller the barrier, and the closer the sound source or the sound perceiver is to the barrier, the more the barrier reduces the sound level at the perceiver’s location (Harrison *et al.* 1980).

### **Motorized Recreation Opportunities**

For some recreationists, vehicle use is either the primary recreational activity or an integral part of it (e.g., OHV-based hunting). In this document, “motorized recreation” and “OHV recreation” means recreational use of single rider three- and four-wheeled all-terrain vehicles (Class I), larger 4x4 vehicles with capacity for a driver and one or more passengers and that may or may not be “street legal” (Class II), and motorcycles (Class III).

Land areas and trails administered by the BLM are designated as Open, Limited, or Closed to operation of OHVs. In Open areas, cross-country travel by all types of vehicles is allowed at any time, away from existing roads and

trails. In Limited-area designations, OHV use is restricted to designated routes, to specific times or seasons, or to specific numbers or types of vehicles only. Off-highway vehicle use is prohibited in areas designated as Closed.

In 2007, the BLM directed its field offices to shift OHV use away from large open areas and focus OHV travel on designated roads and trails (BLM Instruction Memorandum No. 2008-014). Each action alternative responds somewhat differently to this policy direction by shifting from 229,699 acres (Alternative 3) to 234,272 acres (Alternative 5) out of OHV Open designation. Roughly two-thirds of these acres would be designated Limited, and the other one-third would be designated Closed. About 135,361 acres shifted out of Open designation under all action alternatives have sensitive soils (high erosion potential and >30% slope) and/or vulnerable riparian areas (perennial, intermittent, and fish-bearing streams) that render them unsuitable for OHV use and subject to closure regardless of the OHV designation change. Thus, the total area that could realistically be expected to remain available for cross-country OHV travel in the future under Alternative 1, but would not be available for such use under the action alternatives, would range from about 94,342 acres under Alternative 3 to about 98,915 acres under Alternative 5.

Under Alternative 1, there would be 234,272 acres of the plan area that would remain open to unrestricted cross-country OHV travel and 67,332 acres that would remain closed to OHV use. Under Alternative 4, there would be 155,325 total acres that would be closed to OHV travel, compared to about 138,732 total acres that would be closed under Alternatives 2, 3, and 5. Thus, compared to Alternative 1, about 71,363 additional acres would be closed under Alternatives 2, 3, and 5, and about 87,955 additional acres would be closed under Alternative 4. Areas where OHV use would be limited to designated roads and trails would remain at 155,228 acres under Alternative 1 and would range between 301,043 and 315,020 acres under the action alternatives.

Under Alternatives 2 and 3, there would be 3,971 acres on the Rudio Plateau that would remain open to unrestricted cross-country OHV travel. Alternative 3 would also include the 598-acre Golden Triangle OHV open area near the town of Mitchell. Under Alternatives 4 and 5, OHV travel in the Rudio Plateau and Golden Triangle areas would be restricted to designated routes. OHV use would be allowed at Little Canyon Mountain to varying degrees under Alternatives 2, 3, and 4, but not under Alternative 5.

Over the long term, shifting OHV travel away from unrestricted cross-country use to a designated route system is expected to result in significantly less extensive OHV-related resource impacts and conflicts with other resource uses. However, this shift is also likely to result in more intensive use of any remaining open areas and also of the designated OHV route system.

Under Alternative 1, there would be 234,272 acres that would remain open for year-round to dispersed OHV driving on or off existing routes for recreation activities such as horn hunting, backcountry exploration, OHV-supported big game and bird hunting, and rock collecting. Class I and III OHV trails, Class II routes, and technical rock crawling areas would not be provided through an OHV-designated trail or route system, but would still be available to those local OHV users with knowledge of existing opportunities. Loop routes for OHV riding or technical rock crawling would be limited to user-created routes.

Under Alternative 1, existing user-created routes would continue to be used and new ones would be generated. User-created routes are not planned and do not undergo environmental analysis. Poorly located user-created routes often result in significant land, stream, and habitat impacts. Thus, even in the absence of any designation change, some designated Open areas would be subject to emergency closures under 43 CFR §8341.2, which provides the BLM the authority to close areas to OHV use if such use “is causing or will cause considerable adverse impacts” to natural, cultural, or historical resources, or other resource uses.

Under Alternative 1, conflicts and visitor displacement would continue to occur in areas currently being used by both motorized and non-motorized recreationists. As visitor use increases over the long term, conflicts and associated impacts on experience quality could be expected to rise in these areas.

Besides the Little Canyon Mountain OHV open area, no additional OHV trail or route systems would be designated under Alternative 1. Over time, due to the large amount of public lands classified as Open, more unofficial, unplanned OHV areas may be created by riders in other locations on public land outside of Little Canyon Mountain. OHV activities usually involve intensive or repeated use of fairly localized areas and

particular routes such as hill climbs, which could result in resource damage and conflicts with non-motorized recreationists, and with non-recreation resource uses and adjacent private landowners.

Under Alternatives 2-5, OHV use would be concentrated on a smaller amount of routes and areas compared to Alternative 1. Cross-country OHV travel would be allowed at the 3,971-acre Rudio Mountain OHV Open area under Alternatives 2 and 3. Under Alternatives 4 and 5, OHV recreation in the Rudio Plateau area would be restricted to designated routes and trails year-round (Table 4-25). Restrictions on motorized recreation use off designated routes in the Rudio Plateau area could be difficult for BLM to enforce. These restrictions would primarily impact hunters accustomed to using Class I, II, and III OHVs to travel cross-country during hunting seasons in this area. These hunters would no longer be allowed to do so. However, non-motorized recreationists, especially game hunters, would have higher quality recreation opportunities, with reduced or no motorized visitors in the same hunting areas and potentially more productive hunting.

Under Alternative 3, the 598-acre Golden Triangle OHV Area would be established north of Mitchell for seasonal Class I, II and III use. However, this area is currently infested with medusahead (*Taeniatherum caput-medusae*), so eradication would be required before any OHV use would be allowed. It is estimated that eradication would take 3-4 years. Over the long term, the designation of this area for OHV use would provide additional opportunities for OHV recreationists in an area developed specifically for OHV recreation.

The 2-acre South Pit area at Little Canyon Mountain would be open to cross-country OHV travel by Class II vehicles only (Alternative 2) or by all OHVs (Alternatives 3 and 4). Under Alternative 3, the 2-acre North Pit area at Little Canyon Mountain would be open to cross-country use by Class I and III vehicles. The North Pit area would be closed to all OHV use under Alternatives 4, and 5, and available for use as a parking and staging area only under Alternative 2. (Management issues and actions at Little Canyon Mountain are discussed in more detail below.)

Off-highway vehicle use would primarily be limited to about 330 miles of interim designated routes across 313,668 acres in Alternative 2, 301,043 acres in Alternative 4, and 315,020 acres of public land under Alternative 5. Off-highway vehicle use would be limited to 879 miles across 313,067 acres of public land under Alternative 3 (Table 2-23). Class I and III OHV trails, and Class II routes would be designated and signed in areas designated as OHV Limited with Middle Country, Front Country, or Rural setting character. These recreation setting types allow for motorized and non-motorized access and would provide diverse motorized and non-motorized trail and route opportunities. Analysis, planning, and designation of routes of different lengths and difficulty in varying terrain, including loop routes, are expected to increase experience quality in comparison to use of unplanned routes.

Under Alternatives 2-5, opportunities to drive OHVs off-route across open terrain or on unplanned or undesignated, user-created routes would be eliminated across much of the plan area, reducing experience quality and the array of opportunities for recreationists accustomed to such access. These recreationists would be displaced, or align their expectations and use with the kind of OHV experiences being provided, or choose to violate OHV restrictions. Opportunities for cross-country travel would remain available on 3,971 acres under Alternative 2; on 4,571 acres under Alternative 3; on 2 acres under Alternative 4; and no acres under Alternative 5.

Under Alternatives 2 and 3, driving OHVs across public lands and off existing routes for activities such as horn hunting, backcountry exploration, OHV-based game and bird hunting, and rock collecting would be restricted to 3,971 acres (Alternative 2) or 4,571 acres (Alternative 3) designated Open. These opportunities would not be available under Alternatives 4 and 5. Off-highway vehicle recreationists could still pursue these activities on a modified basis by using the 333-mile designated interim route system (provided in Alternatives 2, 4, and 5) or the 879 miles in Alternative 3 to access a variety of areas across acres designated as OHV Limited, but would be required to do any off-route exploration by foot. Prohibiting cross-country OHV use in the John Day riverbed during low flows would displace those OHV users accustomed to this access. However, non-motorized recreationists, river recreationists, and riparian resource values would benefit from this OHV closure.

In the short term under Alternatives 2-5, conflicts could increase if non-motorized recreationists also try to recreate in areas where OHV use is more concentrated, especially shared-use trails, due to greater chances of contact with OHV users. Crowding and conflicts resulting from less extensive, more concentrated OHV use could also occur among groups of OHV users at certain locations and times of year. Under all alternatives, the chances for conflict would be greatest during weekends, holidays, and hunting seasons.

Off-highway vehicles are commonly used by OHV-based hunters to retrieve killed game. Hunters successfully retrieved their game without the use of OHVs prior to development and widespread use of these vehicles, and a significant number of hunters still do not use OHVs. However, OHVs have made game retrieval much easier and many hunters in the planning area use OHVs for this purpose. Alternative 1 has the largest amount of public lands (234,272 acres) open for cross-country motorized OHV use, so opportunities for game retrieval using OHVs off routes are highest under this alternative. Under Alternatives 2 and 3, there would be 3,971 acres on the Rudio Plateau and an additional 598 acres in the Golden Triangle area under Alternative 3 open for year-round game retrieval using OHVs. Opportunities for motorized game retrieval would be limited to designated routes under Alternatives 4 and 5 (Table 2-23).

Restrictions on the use of OHVs to travel cross-country to retrieve game under Alternatives 2-5 would require additional law enforcement time to enforce compared to Alternative 1, which has considerably less land area where such use is restricted. Realistically, some hunters would likely violate these restrictions and not remain on designated routes when retrieving big game.

Under any of the action alternatives, recreationists familiar with the plan area would likely go through a period of adjustment and adaptation as they learn how changes in management are affecting their preferred settings. Over time, conflicts are expected to decrease as a result of better differentiation of settings, increased user familiarity with use patterns in these settings, and increased management focus on targeted activities and experiences. It is expected that most OHV recreationists would be able to achieve satisfying experiences by using a diverse system of designated routes and any remaining open areas.

Alternative 1 would have a 742-mile interim transportation system, including 572 miles open year-round, 61 miles open seasonally, and 250 miles of "landlocked" routes open but inaccessible to the public without permission for access from private landowners. Alternatives 2, 4, and 5 would have approximately a 333-mile system, including 86 miles open year round, 138 miles open seasonally, and 9 miles "landlocked." Alternative 3 would have an 879-mile system, including 295 miles open year round, 475 miles open seasonally, and 250 miles "landlocked." In consideration of the well-documented effects of unrestricted OHV use on soils, watersheds, and wildlife habitat (Ouren *et al.* 2007), Alternatives 2-5 have more seasonal motorized closure acreage to meet wildlife and watershed health objectives than Alternative 1. Alternative 3 has the same seasonal motorized closure areas as Alternative 2, but there are more route miles that remain open and thus greater motorized recreation opportunities under Alternative 3. Opportunities for OHV use would be lost in seasonally closed areas, primarily in the winter and early spring when soils are wet and most vulnerable to rutting and compaction from OHV use.

Under the action alternatives, opportunities for a loop trail riding or driving experience, or for technical rock crawling experiences would be more available than under Alternative 1. Trail or route loops would be identified and signed, providing more opportunities for non-local OHV users who do not possess knowledge of unsigned existing opportunities. Loop routes open for travel in one direction only can increase experience quality by facilitating trips that do not require users to retrace the same route to return to the trailhead and by reducing conflict and resource damage that can result from encounters between 4-wheel OHVs traveling in opposite directions. Loop routes could also help increase safety by reducing chances for collisions.

Assuming no decrease in vehicle use, the OHV traffic volume on the BLM road system and the OHV route and trail maintenance needs would likely increase under Alternatives 2, 4, and 5 because use would be concentrated on a significantly smaller number of route miles compared to Alternative 1. This could lead to more contacts among motorized recreationists and decreased experience quality. Compared to Alternative 1, the total number of route miles open under Alternative 3 would increase, although there would also be more seasonal route closures, so the potential effects of Alternative 3 compared to Alternative 1 are unclear. The extent to which unauthorized user-created routes across the landscape would continue to be created and used under the action alternatives would depend on the availability and diversity of legal, designated OHV routes and compliance with and enforcement of OHV use restrictions.

Rock crawling is a form of OHV recreation that involves low-speed travel across extreme terrain in Class II OHVs that are often significantly modified for such purposes with larger tires, suspensions lifts, lower gears, and undercarriage armor to protect from contact with rocks. Under Alternatives 2-5, if determined to be suitable, a technical OHV Class II rock crawling area would be designated on public lands between Service Creek and

Kimberly on the north side of Highway 19. This area would provide unique Class II rock crawling opportunities for visitors seeking this type of recreation opportunity. The specific route or routes to be designated would be identified in consultation with resource specialists and user groups during plan implementation in order to minimize conflicts with other resource values (wildlife, sensitive soils, and wetlands) and to maximize the quality of the recreation resource. Use would be limited to designated routes; open cross-country travel would be prohibited.

Where rock crawl vehicles travel across bedrock, any moss or lichen cover would be quickly removed but further biophysical impacts may be relatively minimal. To the degree that routes traverse areas interspersed with soil, vegetation, or waterways, rock crawling may be associated with reduced vegetation cover, soil compaction and erosion, wildlife habitat disturbance, and potential impacts to water quality. There may be greater potential with rock crawling than with other types of OHV use for petrochemical fluid leakage into the environment if a vehicle sustains powertrain damage from extreme use or impact with rocks. Rock crawling commonly involves use of on-board electric winches to pull vehicles over particularly challenging obstacles, sometimes using trees as anchor points. There is potential for trees to be uprooted by this practice. Also, use of a metal winch cable directly against the tree trunk may cut through the cambium layer and girdle and kill the tree. Heavy synthetic fabric "tree-saver" winch straps are available to minimize such damage.

Rock crawling is an OHV activity that generally involves intensive use of a relatively limited area. Once routes have been established and accepted as high quality, enthusiasts typically utilize them repeatedly although pioneering of new routes in adjacent areas may still occur and spur routes may be created by users to access campsites. Areas immediately adjacent to rock crawl routes may be utilized for vehicle repairs and by spectators traveling on foot. As with other forms of wildland recreation, the incremental impacts of rock crawling are generally greatest during the initial phase of use after a new route is established. After the route has been used for a period of time, incremental impacts of additional use are typically lower.

#### ***Little Canyon Mountain OHV Use and Adjacent Landowners***

Motorized recreation sounds may affect private landowners who choose to live in areas adjacent to public lands where motorized recreation occurs. Within the plan area, scoping revealed that conflict exists between motorized recreationists at Little Canyon Mountain (especially the North and South Pit Areas) and residents living on adjacent private lands. Some background and analysis regarding this issue is provided below, followed by discussion of how BLM addressed it in Alternatives 2–5 and expected outcomes of these actions.

Sound from OHV use in the Little Canyon Mountain area has occurred for decades, but has changed over time as new types of OHVs were introduced to the marketplace. Sound from motorcycle, ATV, or full-size 4x4 vehicle motors results from OHV users riding up or down the slopes of Little Canyon Mountain, or riding in the North and/or South Pit areas, and from climbing steep hill sides that define these OHV areas. These OHV sounds have historically been a component of the ambient sound in the area. Other sources of sound contributing to the ambient sound level in the area include, but are not limited to, vehicles traveling on the adjacent county road and highway, residential sounds, and aircraft using the nearby airport.

Some adjacent landowners may find the sound from OHV use to be annoying, while other landowners may not. For adjacent landowners who find OHV sound annoying, the level at which it would become annoying would likely vary depending on individual preferences. Some may find any perceptible OHV sound to be annoying, while others might tolerate such sound unless it became "too loud," a subjective assessment that would again vary with individual preferences and sensitivity.

The Federal Highway Administration criterion for traffic noise abatement in residential areas is 67 decibels at the exterior of a residence. Oregon law defines real properties ". . . normally used for sleeping . . ." as noise sensitive properties (OAR 340-035, Noise Control Regulations). These rules stipulate that operation of motor vehicles shall not cause the ambient sound level to exceed 60 decibels at any noise sensitive property within a distance of 1,000 feet or less between the hours of 7 a.m. and 10 p.m., and 55 decibels from 10 p.m. until 7 a.m. Private lands adjacent to the North and South Pit areas are currently zoned rural residential. Most regulation of noise in residential areas is left to local municipalities. A common standard is 55 decibels during daytime and 5-10 decibels lower at night (typically defined as 10 p.m. to 6 a.m.), with allowances that these levels could be exceeded for brief periods. Currently, there is no local ordinance in effect for noise that applies for residents near Little Canyon Mountain, so the current legal limit for motor vehicle sound in this area is 60 decibels.

The amount of ambient sound at an adjacent private residence that is contributed by OHV use at the North and South Pit areas would vary according to several factors. These factors include the number, type, and location of OHVs in use at any one time; the amount of throttle being applied and sound emitted by each individual vehicle; atmospheric conditions such as air temperature and wind; other sounds that contribute to the ambient sound level; and the distance, topography, foliage, and ground cover between the OHV sound being emitted and the receiving location. It would be impractical (if not impossible) to fully account for all of these variables and their interactions and still produce standardized numbers to use for analysis. Thus, potential OHV sound levels are estimated using some fundamentals of sound propagation, and some assumptions regarding how this process occurs at the North and South Pit areas.

Under ideal conditions (e.g., across open water or pavement), sound from a point source will be attenuated (reduced) at a rate of 6 decibels with each doubling of distance from the sound source. Sound attenuation with distance is generally somewhat higher than under “ideal” conditions if the ground cover is grass or loose soil. Because ground cover varies in areas adjacent to the North and South Pits, no allowance is made for it, although some sound attenuation probably does occur due to ground cover. The Federal Highway Administration estimates up to 5 decibels reduction in traffic noise for locations with at least 100 feet of dense evergreen foliage. Because vegetation varies in areas adjacent to the North and South Pits and is generally not dense, no allowance is made for sound attenuation due to absorption by foliage. The starting distance for estimating sound levels at various distances is set at 20 inches, based on the most commonly-used standard for measuring OHV sound emissions for enforcement purposes (Oregon Department of Environmental Quality Motor Vehicle Sound Measurement Procedures Manual NPC-21; Society of Automotive Engineers Standard J-1287).

The North and South Pit areas are each approximately 2 acres in size. Based on this small amount of terrain, the size of OHVs, and the ways that OHVs are used, it is assumed that a limited number of OHVs would use the pit areas at any one time. Sound emissions from multiple sources are not additive. For example, two OHVs producing 90 decibels each will combine to produce 93 decibels, not 180 decibels. This analysis assumes an initial sound level of 103 decibels, which one study found was equivalent to five OHVs operated simultaneously under load with exhausts pointed in the direction of the sound receiver (Michael Minor and Associates, Inc. 2008). Although it is possible that more than five OHVs may sometimes be in use at the pit areas, the sound level resulting from this five-vehicle use scenario was judged to represent a reasonable “average maximum” for the purposes of analysis.

Table 4-23a shows estimated sound levels at a range of distances from the North and South Pit areas, under the assumptions outlined above. These estimates are conservative in that the BLM expects that they would rarely be exceeded, and actual sound levels would usually be lower under any of the action alternatives.

**Table 4-23a. Estimated Attenuation of Sound from Five OHVs Operated Simultaneously Under Load Based on 6 Decibels Attenuation With Each Doubling of Distance.**

Distance from OHV sound (feet)	1 $\frac{1}{3}$	3 $\frac{1}{3}$	6 $\frac{2}{3}$	13 $\frac{1}{3}$	26 $\frac{2}{3}$	53 $\frac{1}{3}$	106 $\frac{2}{3}$	213 $\frac{1}{3}$	426 $\frac{2}{3}$	853 $\frac{1}{3}$	1,706 $\frac{2}{3}$
Sound level (decibels)	103	97	91	85	79	73	67	61	55	49	43

Table 4-23b shows the number of residences that occur in the proximity of the North and South Pit Areas at Little Canyon Mountain in 0.25-mile increments up to 1 mile. From the North Pit, it is 326 feet to the nearest property line, and 937 feet to the nearest residence. From the South Pit, it is 1,654 feet to the nearest property line, and 1,839 feet to the nearest residence. Based on actions taken to mitigate OHV sound, the BLM estimates that OHV sounds under any of the action alternatives are unlikely to exceed the commonly used standard of 55 decibels for daytime noise in residential areas at any residence in the proximity of the North and South Pit areas. It is possible that sound from OHV use could occasionally exceed 55 decibels at the private property line closest to the North Pit. The BLM notes that assuming a 55 decibels limit is conservative compared to the current legal limit of 60 decibels for motor vehicle sound that applies to residences adjacent to the North and South Pits.

**Table 4-23b. Number of Private Residences Within a 1-mile Proximity of the North and South Pit Areas at Little Canyon Mountain.**

Location	Distance				
	0–1,320 feet (0–0.25 mile)	1,320–2,560 feet (0.25–0.50 mile)	2,560–3,960 feet (0.50–0.75 mile)	3,960–5,280 feet (0.75–1 mile)	Total (≤ 1 mile)
North Pit	1 residence	6 residences	26 residences	24 residences	57 residences
South Pit	0 residences	4 residences	10 residences	25 residences	39 residences

To complement and test the assumptions made in the analysis outlined above, BLM staff conducted a field test of sound generated by OHV use at the North and South Pit areas. Sound data was collected by seven vehicles, including two single-rider 4-wheel (Type I) OHVs, two 2-stroke motorcycle (Type III) OHVs, two full-sized 4WD truck (Type II) OHVs, and one “side-by-side” utility terrain vehicle were used. All seven OHVs were driven concurrently in a manner intended to produce the highest possible combined sound levels at adjacent residences (i.e., use concentrated at the side of each pit closest to the nearest residence, heavy application of throttle, climbing steep inclines, with exhausts directed primarily at the receiving location). This use scenario was judged to be a reasonable approximation of “average maximum” OHV sounds conditions at the North and South pit areas. Public OHV use could generate different volumes and speeds. However, it is likely speeds would decrease with greater volumes. Reduced OHV operating speeds typically would reduce noise levels.

Recordings of noise and reports of process and findings were completed by Axiom-Points, LLC. The full report is on file at the Prineville District Office. The noise level was averaged and then rounded to the nearest whole decibel (dBA). The criteria for acceptability of the measurements were that different Ambient Noise measurements were within +/- 3 dBA of each other, and no extraneous sound sources contaminated the data. Noise measurements were taken until noise levels during a particular sample time frame stabilized at each monitoring location. Repeat measurements were obtained until the measurements agreed within 1 dBA. Measurements were averaged to establish one set of noise data for each position.

Data acquisition involved noise measurements at selected locations to represent three field conditions: OHVs in use at the North and South Pits and OHVs not in use. Results at each location are shown in Table 4-23c.

**Table 4-23c. Field Measurements of Sound Levels (Decibels) With a Combination of Seven OHVs in Concurrent Use at the North Pit or South Pit.**

Little Canyon Mountain February 9, 2010 Sound Assessment					
Location	Distance from House or ‘Edge’ of Travel Way (feet)	Ambient Noise Leq (dBA) by Field Condition			
		OHV not in Use	OHV in Use South Pit	OHV in Use North Pit	
R1	14	40	31	47	
R2	10	33	39	No Measurement	
South Pit	50	No Measurement	66		
	100		57		
North Pit	50 at grade		No Measurement	No Measurement	67
	50 above cutbank				54
NE of North Pit Entrance	574 from R3			49	

Based on the ambient field measurements, noise propagation from the pits drops off at a minimum of 6 decibels per distance doubling. The topography surrounding the pits helps to reduce OHV noise because steep cut banks act as noise barriers. Vegetation in the area surrounding the pits reduces noise levels from OHVs because of its density (cannot be seen through). A 200-foot width of dense vegetation between the noise source and the receiver can reduce noise by 10 decibels, which cuts the loudness of noise in half. Ambient noise levels measured at residences are no greater than 47 decibels with OHVs in use for this field test. The change in dBA was roughly 6 to 7 with OHVs in use at R1 and R2. This level may be compared to living on quiet residential street (Axiom-Points 2010).

Sound levels were measured for only one of many possible scenarios for OHV use at the North and South pit areas. However, these field test results suggest that BLM estimates shown in Table 4-23a for (1) maximum sound levels from OHV use at the North and South Pit areas, and (2) the rate of OHV sound attenuation away from the pit areas, under any of the action alternatives, are conservative and not likely to be exceeded under most conditions, as long as all OHVs in use meet sound level regulations.

Table 4-24 shows that sound from OHV use would be reduced under Alternatives 2–5, compared to Alternative 1, due to time of day, day of week, type of OHV, and/or seasonal OHV restrictions. The cumulative effect of these restrictions on OHV use would reduce OHV sound, due to reduced OHV use under Alternatives 2–5, especially Alternatives 4 and 5.

**Table 4-24. Number of Days Sound From Off-Highway Vehicle Use Could be Heard on Public Land From Little Canyon Mountain Area.**

Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
On motorized use trails in central portion of LCM	365	365	365	209	0
On OHV trails in Buffer Areas	365	365	365	365	0
North OHV Pit	365	0	365	0	0
South OHV Pit	365	365	365	365	0

### *Little Canyon Mountain Proposed Management Actions*

The effects of management actions proposed for the North and South Pit Areas, and for Little Canyon Mountain, are discussed below for each alternative. Management actions proposed for Little Canyon Mountain under Alternatives 2–5 reflect variations in ways to reduce conflict between OHV use and adjacent landowners, increase recreation experience quality for non-motorized recreationists, decrease the extent of impacts resulting from unrestricted OHV use, and provide diverse and satisfying OHV-based recreation opportunities. Of the action alternatives, Alternative 3 restricts OHV use and benefits non-motorized recreationists in the Little Canyon Mountain SRMA the least, whereas Alternative 5 restricts OHV use and benefits non-motorized recreationists the most.

### **Alternative 1**

#### *North and South Pit Areas*

Under Alternative 1, the North and South Pit areas at Little Canyon Mountain would remain open to all OHV use with no restrictions on time of day use or vehicle type. Sounds from OHV use at the North and South Pit areas would be most frequent and apparent under Alternative 1.

#### *Little Canyon Mountain*

Under Alternative 1, the Little Canyon Mountain area would not be designated as a SRMA. The area would remain open to unrestricted cross-country travel by all types of OHVs without time of day or time of year restrictions. There would not be trails dedicated to non-motorized use. Motor sounds would continue day or night, producing the highest potential for conflicts with adjacent landowners and non-motorized recreationists who find these sounds annoying. Limited enforcement of decibel sound limits would continue.

Extensive open areas with little or no trail and public land signing would result in OHVs traveling cross-country, occasionally across private land boundaries, and on existing user-created routes, some of which also extend onto private lands. Thus, potential for trespass onto adjacent private lands and conflicts with these landowners would be highest under Alternative 1.

Under Alternative 1, unregulated and increasing use would cause trail and route conditions to degrade over time. The area would not benefit from SRMA designation, which would occur under any of the action alternatives and focus funding on planning, design, maintenance, or erosion controls to mitigate impacts from OHV use. Unplanned, user-created routes would offer the only opportunities for OHV users seeking more challenging routes. Conflicts between motorized and non-motorized recreationists would likely increase over the long term, as recreation use increases on the existing system of routes that are undifferentiated by user type.

## **Alternative 2**

### ***North and South Pit Areas***

Under Alternative 2, the 2-acre North Pit area would be closed to all OHV use except as a parking and staging area, rather than open to all OHV use as in Alternative 1. The 2-acre South Pit area would be open to cross-country OHV travel by Class II vehicles only, rather than open to all OHVs as in Alternative 1. Class II OHVs typically emit lower frequency sound than Class I or III OHVs, which would be excluded from the South Pit under Alternative 2. Lower frequency sounds may be less annoying than higher frequency sounds in recreation settings (Kariel 1990). Under Alternative 2, the maximum allowable OHV sound level at the South Pit area would be reduced from the current Oregon state standard of 99 decibels to 96 decibels.

Compared to Alternative 1, Alternative 2 would be expected to result in reduced OHV noise impacts to adjacent landowners because the North Pit would be used only as a parking and staging area rather than open to all types of OHV use and the maximum allowable sound emission for individual vehicles would be reduced; as a result, lower frequency OHV sound would emanate from the South Pit.

Under Alternative 2, OHV use at the South Pit would be limited to 9 a.m.-dusk daily. This time of day restriction would benefit recreationists who desire opportunities for quiet recreation in this area prior to 9 a.m., and would preclude chances that adjacent landowners could be exposed to OHV sounds in the early morning hours. Impacts to OHV users from this restriction are expected to be minimal since most current use occurs after 9 a.m.

### ***Little Canyon Mountain***

Under Alternative 2, except for Class II OHV use at the South Pit area, opportunities for Class I, II and III OHV use would be limited to designated routes whereas under Alternative 1, OHVs of all types would be free to travel cross-country on Little Canyon Mountain. Under Alternative 2, OHV use on Little Canyon Mountain would be limited to 9 a.m. - dusk daily, whereas under Alternative 1 OHV use could potentially occur at any time of day or night.

Under Alternative 2, designated routes and trails would be developed to help reduce user conflicts, separate motorized and non-motorized uses in some areas, and provide shared use on designated routes and trails in other areas. Limiting OHV use to a system of designated motorized trails located away from private land boundaries would decrease the amount of area affected by sounds and environmental impacts associated with OHV use, and resulting conflicts. Motorized opportunities would be reduced and non-motorized opportunities would be enhanced by development of a non-motorized trail system close to John Day and Canyon City under Alternative 2.

Opportunities that exist under Alternative 1 for OHV users to drive their vehicles across the landscape away from existing routes on Little Canyon Mountain would not be available under Alternative 2. Existing trails and routes would be augmented by limited development of new trail or routes, as necessary, to provide non-motorized and motorized Class I and III trail and Class II route loops. Some designated trails or routes may be limited to specific types of OHV use, such as a technical Class III trail, which would enhance experience opportunities for Class III OHV recreationists compared to Alternative 1.

Under Alternative 2, Class I and III OHV users would be excluded from the North and South Pit areas and may instead seek riding opportunities elsewhere on Little Canyon Mountain where such use would be permitted on designated routes, increasing the level of use and OHV-related impacts on these routes compared to Alternative 1. These impacts may be mitigated by development of a limited number of additional routes and improved maintenance that may result from SRMA designation.

## **Alternative 3**

### ***North and South Pit Areas***

Under Alternative 3, the South Pit would remain open to Class I, II and III OHV use. The North Pit would be restricted to Class I and III OHVs only. As with Alternative 2, OHV use under Alternative 3 would be limited to 9 a.m. – dusk daily, providing opportunities for quiet recreation in the area prior to 9 a.m., and precluding chances that adjacent landowners could be exposed to OHV sounds in the early morning hours.

Compared to Alternative 1, Alternative 3 would provide some mitigation of conflict with adjacent private landowners by precluding use of Class II OHVs at the North Pit, and by precluding all OHV use at both pits

between the hours of dusk and 9 a.m. Compared to Alternatives 2, 4, or 5, conflicts with adjacent landowners and non-motorized recreationists in the area would be mitigated to a lesser degree under Alternative 3 because OHV use would be allowed in the North Pit, and more types of OHV use would be allowed overall.

### ***Little Canyon Mountain***

Impacts of Alternative 3 management actions at Little Canyon Mountain outside of the pit areas are expected to be similar to those under Alternative 2. One possible exception may be that because Class I and III OHV recreationists would be displaced only from the North Pit under Alternative 3, rather than from both the North and South Pits as under Alternative 2, fewer Class I and III OHV users may seek alternative areas elsewhere on Little Canyon Mountain to drive their vehicles under Alternative 3.

## **Alternative 4**

### ***North and South Pit Areas***

Under Alternative 4, the South Pit would remain open to all types of OHV use, whereas the North Pit would be closed to all OHV use, including use as a trailhead and staging area. Motorized use at Little Canyon Mountain would be limited to the hours from 9 a.m. to 6 p.m. on Mondays, Wednesdays, Fridays, and Saturdays only. This would provide assurance that opportunities for quiet, non-motorized recreation in the absence of OHV effects would always be available on Tuesdays, Thursdays, and Sundays. This assurance would not be provided by Alternatives 1, 2, or 3.

On days when OHVs were in use at the South Pit area, sounds from such use would end at 6 p.m. under Alternative 4, rather than at dusk as under Alternatives 2 and 3. Thus, the hours between 6 p.m. and dusk would be available for quiet non-motorized recreation, and adjacent landowners would not be exposed to OHV sounds during this time, even on days when OHV use was permitted.

Under Alternative 4, OHV sounds emanating from the South Pit area would likely be higher pitched compared to Alternative 2. This is because all types of OHVs (including Classes I and III, which typically emit higher-pitched sounds) would be allowed under Alternative 4, whereas only Class II OHV use would be allowed under Alternative 2. On the other hand, no OHV sounds at all would emanate from the South Pit area on Tuesdays, Thursdays, and Sundays under Alternative 4; whereas, under Alternatives 1, 2, and 3 OHV sounds could emanate from the pit area on any day of the week.

### ***Little Canyon Mountain***

Under Alternative 4, motorized use at Little Canyon Mountain would be restricted to the hours from 9 a.m. to 6 p.m. on Monday, Wednesday, Friday, and Saturday of each week; whereas, motorized use would be allowed from 9 a.m. until dusk on all days of the week under Alternatives 2 and 3. Thus, compared to Alternatives 2 and 3, there would be more opportunities for quiet recreation between the hours of 6 p.m. and dusk on Monday, Wednesday, Friday, and Saturday of each week under Alternative 4. On Tuesday, Thursday, and Sunday of each week there would be opportunities for quiet recreation at all hours of the day under Alternative 4 that would not be provided under Alternatives 1, 2, and 3. Non-motorized recreationists could visit Little Canyon Mountain on these days and not be impacted by OHV activities; whereas, under Alternatives 1, 2, and 3, non-motorized recreationists could still hear OHV noise on any day of the week, even when physically separated or on a different trail, due to the distance OHV sound can propagate across the landscape. However, fewer OHV recreation opportunities would be available on Little Canyon Mountain under Alternative 4 than under Alternatives 1, 2, and 3.

Under Alternative 4, OHV users might ignore OHV day of week and time restrictions, riding on restricted days and in evenings, particularly during late spring to fall when daylight extends beyond 6 p.m. Some OHV users might stop riding or find other areas on BLM or other lands to ride within the vicinity. Non-motorized users would likely learn to schedule their activities when OHV use is restricted and use more shared use trails. This would expand the range of quality non-motorized recreation opportunities in the area.

Under Alternative 4, higher-elevation routes would have a seasonal OHV use restriction that would limit all OHV use during the winter and early spring months of the year when soils are wettest and most sensitive to compaction, rutting and erosion. Seasonal closures of some trails would increase the intensity of OHV use on trails or routes that remain open year-round. Depending on actual use levels, this increased use might or might

not result in crowding and conflict among OHV users on remaining open trails. The chances for conflicts would be greatest during weekends, holidays, and hunting seasons.

## **Alternative 5**

### ***North and South Pit Areas***

Under Alternative 5, no opportunities for Class I, II, and III OHV use would be available and no OHV sound would be heard emanating from the North and South Pit areas of Little Canyon Mountain because these activities would be prohibited in the North and South Pit areas. The OHV closures and elimination of OHV sound from the North and South Pit areas under Alternative 5 would provide the most benefits of any action alternative to adjacent landowners who are close enough to hear these sounds, but prefer not to, and who may be negatively impacted by other OHV effects such as dust. Any adjacent landowners who are themselves OHV users might be negatively impacted by the loss of OHV recreation opportunities close to their residences. Non-motorized recreationists, such as mountain bikers, might utilize the area and would also benefit from newly available opportunities to ride at the North and South Pit areas without having to compete with OHV users for space on the trails, and without exposure to OHV noise, dust, and the potential for collisions.

Restrictions on OHV use at the North and South Pit areas to certain areas, times of day, days of the week, or types of vehicles under Alternatives 2–5 would require a commitment to enforcement efforts. Greater restrictions would impact those OHV recreationists now utilizing the area who are accustomed to current levels and kinds of access. These recreationists may adapt to changes in OHV management in the North and South Pit areas, be displaced to other areas, or choose to violate use restrictions. Displaced OHV recreationists may go elsewhere on public land or trespass onto private lands for riding opportunities, which could generate additional conflict in those areas. Over time, conflicts are expected to decrease as a result of better differentiation of settings, increased user familiarity with recreation options and use patterns in these settings, and increased management focus on targeted activities and experiences.

### ***Little Canyon Mountain***

Under Alternative 5, all routes on Little Canyon Mountain would be restricted to non-motorized use only. No OHV recreation opportunities would be available. Under Alternative 5, all motorized recreationists who currently ride on Little Canyon Mountain routes would be displaced to other areas, would quit riding, or would violate use restrictions. Use of existing routes on Little Canyon Mountain could be substituted by creation of new unofficial, unplanned routes in other areas, with associated resource impacts and potential conflicts with private landowners. Non-motorized recreation on Little Canyon Mountain would improve more under Alternative 5 than any other alternative, with opportunities to recreate throughout the area at any time without being affected by OHV noise, speed, or dust. Exclusion of fast moving vehicles and motor sounds would increase the perceived naturalness of this recreation setting, and may also result in better opportunities to view birds and other wildlife.

## **Travel Management Effects on Recreation**

A wide range of quality non-motorized and motorized recreation opportunities would result from the interim and final transportation system under Alternatives 2–5. This travel management system would provide more diversity and benefits than Alternative 1 by including designated non-motorized trails, as well as designated routes and trails for motorized Class I, II, and III OHV use that would be managed and maintained to provide public access and different levels of difficulty for different recreation activities.

Alternatives 2–5 would impact hunters in different ways, depending on their preferences and views concerning the use of OHVs to assist in hunting. Use of OHVs makes accessing hunting areas, and retrieval and transport of game considerably easier, but some hunters are concerned that use of OHVs can disrupt hunts and disturb other hunters. Limiting OHV use to designated routes under Alternatives 2–5 would affect those horn hunters and big game hunters that have historically traveled cross-country using Class I, II, and III OHVs. Despite restrictions that would occur under Alternatives 2–5, some hunters may continue to drive their OHVs cross-country, creating more unauthorized routes and trails to get to their hunting locations or retrieve big game. This unauthorized motorized travel off designated routes would increase the need for monitoring and enforcement of restrictions on OHV use, and associated costs.

Limiting OHV-based hunters to designated routes and trails under Alternatives 2–5 is expected to enhance recreation opportunities for non-motorized recreation users who prefer or require quiet public lands to pursue their recreation activity, compared to Alternative 1. Limiting motorized use to designated routes and trails is also expected to provide additional unroaded big game habitat compared to Alternative 1, resulting in a more big game to hunt and higher quality hunting experiences over the longer term.

No motorized road density limits would exist under Alternative 1. The OHV use would not be restricted by potential road density restrictions on 456,610 acres of public land, or 100% of public lands in the plan area. Potential trespass onto adjacent private land and potential conflicts with adjacent landowners would be highest under Alternative 1. Designated routes and trails would not be identified or signed, resulting in OHV users traveling on routes or trails that may be located on private land. Lack of road density restrictions may result in displacement of wildlife in highly roaded areas, thus reducing game hunting opportunities in those areas.

### **Special Designations Effects on Recreation**

Special designations include Wilderness Areas, WSAs, areas identified to protect wilderness character, ACECs, and WSRs. Special designations generally restrict motorized recreation activities to a greater extent than non-motorized, although mountain biking is not allowed in designated Wilderness areas.

The fewest number of special designations would occur under Alternative 1. Other resource BMPs from existing land use plans currently limit motorized recreation use to existing routes in Wild and Scenic River corridors where public motorized access is available. Most motorized recreation use currently occurs outside WSR areas.

No motorized or mechanized recreation use would be allowed in the newly designated 6,497-acre Spring Basin Wilderness Area under any alternative.

Under Alternatives 2–5, motorized and non-motorized use would not be affected by existing or proposed special designations. Class I, II, and III OHV riding or driving opportunities in areas proposed to be designated as ACECs either currently do not exist, or are very limited. All motorized use within Wild and Scenic River corridors would be limited to designated routes.

Most motorized use occurs outside WSAs, except for two-vehicle routes in the Sutton Mountain and Aldrich Mountain Wilderness Study Areas, so additional effects to motorized use would not occur under any alternative. Motorized recreation use in ACECs would be limited to designated routes, so no effects to motorized use would result from ACEC designation. Under any alternative, non-motorized recreation opportunities would continue to be available in special designated areas.

Under Alternative 1, existing WSAs would continue to provide opportunities for non-motorized activities. Motorized recreation use in WSAs and ACECs would continue to be limited to designated routes where motorized recreation use is allowed.

Under Alternative 2, opportunities for non-motorized use in WSAs would be the same as identified for Alternative 1. Opportunities for motorized activities in the lower John Day and Pat's Cabin WSAs would be the same as Alternative 1. Opportunities for motorized activities would be available seasonally on designated routes in the Aldrich Mountain, but would not be available on 2 miles of route in the Sutton Mountain WSA under Alternatives 2–5. Motorized big game hunters would be the primary recreation group displaced due to these two route closures.

Under Alternatives 2, 3, and 5, areas having wilderness character totaling 19,442 acres would provide upland non-motorized recreation opportunities in areas where motorized recreation use is not allowed. Under Alternative 4, there would be 35,457 acres managed for wilderness character, offering these same opportunities for non-motorized recreationists.

### **Back Country Byways Effects on Recreation**

Continued opportunities for driving for pleasure, wildlife and nature study, photography, and other recreation opportunities would be available by management of the existing South Fork John Day River Back Country Byway,

a 50-mile byway paralleling the South Fork John Day River. Designation of the 41-mile Sutton Mountain Road as a BLM Back Country Byway or State Scenic Byway under Alternatives 2–5 would provide additional roadside viewing opportunities along the designated route circling the Sutton Mountain WSA compared to Alternative 1.

### **Aquatic and Riparian Management Effects on Recreation**

The Aquatic Conservation Strategy and riparian BMPs of Alternatives 2–5 may restrict or prohibit motorized and non-motorized use and vehicle routes in riparian areas. These restrictions would be due to water quality, soil erosion, sedimentation, and aquatic resource concerns. Road construction and maintenance for motorized and non-motorized trails and routes may be limited, or may require additional costs over those needed to implement Alternative 1 to meet aquatic and riparian objectives and BMPs. These management guidelines may include altering or closing stream crossings and doing habitat restoration.

Motorized recreation use may be temporarily or permanently affected by seasonal or year-round road or trail closures in all alternatives. Most motorized recreation use in riparian areas is along the North and South Forks of the John Day Rivers and in locations along the main stem of the John Day River by visitors using these areas to camp, fish, hunt, raft, and sightsee. Re-routes to prevent motorized use in creeks would not affect motorized users. However, route closures without alternative routes would displace motorized use in these areas and opportunities to connect to other primitive routes may not occur, resulting in lost motorized opportunities in these situations.

Most recreationists value high water quality and are often drawn to streams and lakes for fishing, boating, camping, and other activities. Thus, despite any short or longer-term restrictions on route access or certain recreation activities, actions that improve water quality and instream flows and that reduce erosion and sedimentation are expected to improve recreation values over the long term.

### **Wildlife Management Effects on Recreation**

Under Alternative 1, motorized recreation opportunities would be least confined by seasonal wildlife restrictions. This alternative has the least amount of seasonal closure acreage, 86,793 acres, or 19% of public lands in the plan area.

Seasonal motorized closures to benefit wildlife would preclude motorized use from November 30 through April 15 on slightly over 331,000 acres of public lands in the action alternatives annually. Thus, compared to Alternative 1, Alternatives 2–5 would reduce year-round motorized opportunities. However, a large portion of these public lands are not accessible to the public due to no legal access, or to OHVs due to deep snow or wet soil conditions during the winter.

Opportunities for wildlife viewing and other non-motorized recreation opportunities may be enhanced by greater seasonal motorized closures under Alternatives 2–5 than Alternative 1, due to reductions in wildlife–OHV encounters. Any improvements in quiet recreation experience quality resulting from reduced motorized recreation access would tend to be situational and hard to generalize. However, it is likely that several types of non-motorized activities would benefit from having larger areas seasonally free of OHV use. Recreation settings may show improved ecological integrity from being subjected to OHV use for a smaller portion of the year, but displacement of OHV users from seasonally closed areas may concentrate use in areas and on routes that remain open year round. Hunters and wildlife viewers should eventually benefit from larger game populations and healthier animals as habitat fragmentation and OHV impacts to wildlife in critical winter feeding areas are mitigated by seasonal closures.

Road density limits under Alternatives 2–5 apply to all roads across public lands (including State, County, and local routes). The effects of implementing road density limits are the same for Alternatives 2–5. Road density limits apply to all lands except those with an Open OHV designation; thus, Alternatives 2 and 3 have approximately 4,000 acres that do not have a road density limit.

The mileage of BLM roads available for motorized recreation use under Alternatives 2–5 would be less than motorized recreation opportunities under Alternative 1 (see Transportation Effects for more details). Current road densities are the highest in Upper John Day and North Fork John Day Areas. Actual identification of roads to

be closed to motorized use would be determined as part of the transportation management plan. However, this potential road reduction may or may not reduce motorized recreation opportunities in these areas.

### **Air Quality Effects on Recreation**

Air quality restrictions are not expected to limit motorized recreation use throughout the plan area due to the generally dispersed nature of motorized use and associated dust production. Under all alternatives, air quality restrictions resulting from OHV use would most likely occur in designated OHV Open areas.

### **Cultural Resources Effects on Recreation**

In areas where site-specific monitoring reveals cultural resource concerns, primitive road or trail construction for recreation use and road or trail rehabilitation and maintenance activities may be restricted. Such areas may also be limited to non-motorized use, closed to all use, or have mitigation measures applied to limit effects of recreation activities on cultural resources under any alternative. Restricting or closing trails or routes would reduce motorized and non-motorized recreation opportunities where these restrictions are implemented.

### **Energy and Mineral Resources Effects on Recreation**

In areas developed for energy or mineral resources, visitor satisfaction could decrease if such development resulted in closures of recreation routes, trails or reductions in site access to provide safe access for specific energy and mineral uses. Long-term mitigation measures could resolve any potential conflicts, such as relocating existing or user-created routes (Alternative 1), or designating motorized or non-motorized recreation primitive routes or trails (Alternatives 2–5) around the energy or mineral resource and associated roads. The effects of trail or route relocation would be similar under all alternatives.

### **Fire and Fuels Management Effects on Recreation**

Recreationists value “natural” settings and within its historic range wildfire is a natural process. Recreationists’ tolerance for the effects of wildfire and fuels management activities would be related to their knowledge and views regarding the ecological role of fire and how past management has affected forest ecosystems.

In general, outdoor recreationists prefer settings with green vegetation as opposed to recently burned areas. But many potential ecological benefits of fuels management and prescribed fire also indirectly benefit recreationists, including protection of larger trees, increased biodiversity and ecosystem resilience, less crowded stands, and improved wildlife and game habitat. Shorter-term reductions in access or impacts to esthetic qualities of recreation settings could be offset by longer-term benefits to these settings. Morel mushrooms often fruit abundantly in recently burned areas of dry conifer forests, and some recreational morel collectors actively seek out such areas. Benefits to recreationists that result from less intense prescribed fires, such as increased big game forage and hunting experience quality, may become evident in 2-3 years. Stand-replacing wildfires, however, could have longer term impacts by significantly altering or eliminating valued recreation setting qualities for time periods of several years to decades.

Temporary route, trail, or area closures following prescribed burns or wildfires may be necessary to allow time for these areas to revegetate. Such closures could displace hunters using Class I, II, and III OHVs to other hunting areas. Routes heavily used by fire equipment may be temporarily damaged but could be repaired by post-fire rehabilitation efforts. Fire dozer lines may limit trail or route use by impacting primitive routes or trails used by motorized and non-motorized users, unless damaged routes and trails are rebuilt at the time by fire incident personnel. Providing prompt rehabilitation from fire management activities would minimize long-term loss of motorized or non-motorized routes or trails resulting from these activities.

### **Livestock Grazing Management Effects on Recreation**

For some recreationists, setting and experience quality are reduced by the presence of livestock and to a lesser extent by the visual effects of grazing use. Some of these recreationists may choose to recreate only in areas where livestock are not present and their effects on the landscape are not readily noticeable. Motorized recreation use would not be restricted by grazing management in OHV Open areas. In Limited areas, motorized recreation use may be confined by livestock fenced areas, unless gates and/or cattle guards are installed to allow motorized recreation access between livestock pastures and allotments. If cattle guards are not installed, motorized use

would be confined to areas without fences. Non-motorized recreationists are generally less restricted by fences. Fences can be constructed with openings just wide enough to allow hikers, mountain bicyclists, and perhaps motorcyclists but not livestock to pass through.

### **Lands and Realty Effects on Recreation**

Land acquisitions or exchanges to connect and aggregate existing BLM public land parcels would enhance visual qualities and recreation values of public lands. Greater connectivity of discrete parcels that currently lack public access into larger, more accessible blocks would increase recreation experience quality by providing consistent and stable land use patterns across larger areas, fewer conflicts with private landowners, and more space for dispersed recreation. Larger blocks of land with fewer inholdings of more intensively managed parcels would also benefit big game habitat, and thus hunting experience quality.

Visual qualities would be retained on public lands zoned Z-1 along the main stem of the John Day River, the South and North Forks John Day River, and Dixie Creek; and in Little Canyon Mountain areas, Rudio Mountain, Johnson Heights, and surrounding Sutton Mountain. Alternatives 2–5 have the largest acreage of public lands retained for future management and use, totaling approximately 355,000 acres. There is 70% more public land zoned Z-1 under Alternatives 2–5 than under Alternative 1 (Table 2-23).

A greater number of acres would be zoned Z-3 under Alternatives 2-5 than Alternative 1, so visual qualities may be reduced on these tracts of public land. Alternatives 2-5 have the highest potential for loss of open space through potential disposal of approximately 68,000 acres of Z-3 public land, compared with 40,444 acres zoned Z-3 under Alternative 1, an increase of 79% more public land available for disposal than in Alternative 1.

Generally, land tenure adjustments that aggregate public lands and improve public access would enhance river-based, motorized, and non-motorized recreation use opportunities. In addition, rights-of-way that consider increasing public access would increase the mileage of routes available and increase the quality of recreation opportunities.

The potential loss of BLM public lands with a Zone 3 classification for disposal or sale could eliminate potential OHV Class II technical rock crawling opportunities on public lands north of Highway 19 between Kimberly and Service Creek. Primitive elk and deer hunting opportunities may be lost in the Johnson Heights area and the Rock Creek area east of Condon, if public lands in those areas are exchanged. Recreation and Public Purposes (R&PP) leases on lands near municipalities may decrease or increase motorized or non-motorized recreation opportunities, depending on the type of R&PP lease.

### **Soils Effects on Recreation**

Soils management BMPs under all alternatives may reduce some opportunities for designated OHV Class I and Class III trails and Class II routes in riparian areas. Recreation sites for OHV visitors to camp and use during the day may also be limited to designated sites. Restrictions on route or trail slope may limit or prohibit routes or trails designed for more or most difficult motorized and non-motorized trail users, unless mitigations for preventing soil erosion are part of the designated motorized or non-motorized trail system.

### **Vegetation Management Effects on Recreation**

Timber harvesting and hauling activities and other treatments under all alternatives could reduce both motorized and non-motorized recreation opportunities by causing short-term route or trail closure, and short-term damage or additional maintenance to routes or trails used by motorized and non-motorized recreation users. These treatments may also impact visitor experiences by altering setting characteristics such as remoteness and naturalness. Over the long term, proactive forest and woodland management could increase the quality of recreation experiences to the degree that it promotes aesthetically pleasing, diverse vegetative landscapes that are less vulnerable to uncharacteristically severe wildfires.

Uncharacteristically severe wildfires that alter and replace vegetative stands would leave a more barren landscape with less visual appeal to public land users, tourists, and local residents. The action alternatives provide priority criteria that would direct management to timbered stands to a greater degree than the no action, thus reducing potential impacts to recreationists due to wildfire.

Successful weed treatment over the long term is not expected to affect recreation or cross-country OHV use.

### **Visual Resource Management Effects on Recreation**

The VRM guidelines are expected to enhance motorized and non-motorized recreation route and trail opportunities and contribute to providing quality experiences in a landscape by retaining existing visual quality. Some routes or trails may be relocated or designed to meet appropriate VRM guidelines, helping to ensure landscapes and route or trail systems are aesthetically pleasing to all types of recreation visitors.

### **Public Health and Safety Effects on Recreation**

Providing recreational shooting closures like the one proposed at Little Canyon Mountain would increase public safety for visitors recreating for other purposes in those areas. It would also reduce the potential for visitors to be displaced due to concerns about firearm use. Closures like the one at Little Canyon Mountain will impact a very small proportion of the plan area and numerous opportunities for recreational shooting would still exist. Closure areas would remain open to legal hunting so there would be no reduction in hunting opportunities.

### **Cumulative Effects on Recreation**

Population growth in Oregon and more visitor use coming from western Oregon and other areas outside the state would continue to result in increased motorized and non-motorized recreation use on public lands. This increase would likely be most apparent in the popular Little Canyon Mountain, North and South Forks John Day River, and Rudio Mountain areas.

Although some private landowners currently allow public access across their lands, many do not. As landowners change, there is an increased likelihood that someone will deny public access across their land, reducing public access to public lands not legally accessible. These impacts may be reduced by the BLM and Oregon Department of Fish and Wildlife purchasing public access easements across private lands.

Motorized public access will continue to be more limited over time as the U.S. Forest Service Umatilla, Wallowa-Whitman, Malheur, and Ochoco National Forests develop and implement travel management plans that will generally restrict motorized use more than current travel management regulations for these National Forests.

Motorized and non-motorized recreation opportunities will still be available in various amounts on these forests, helping to meet the regional demand for these activities beyond existing and future opportunities available on BLM public lands in the plan area. The 6,000+ acre Morrow County OHV park will continue to provide Class I, II, and III riding opportunities, helping to provide these experiences in the region.

On BLM lands, seasonal closures, soil guidelines and road density restrictions would eliminate some roads, which would affect motorized recreation users by eliminating year-round motorized recreation use in some areas. Although motorized hunting access would be reduced, big game animals may also be more abundant in unroaded areas, providing more opportunities for big game hunting in the long term and increased non-motorized recreation opportunities such as wildlife viewing, wildlife photography, and other outdoor activities. These opportunities are expected to be enhanced with similar management actions occurring on adjacent U.S. Forest Service and Oregon Department of Fish and Wildlife public lands.

The closure of routes and seasonal use restrictions in Alternatives 2-5 will cause increased recreation use on routes that remain open to motorized use. Increased visitation and motorized use within the plan area would have cumulative effects on BLM's ability to designate, sign, and maintain a final motorized and non-motorized designated route and trail transportation system.

User-created routes and motorized seasonal closures violations are expected to increase over time, especially during big game hunting seasons in the North and South Fork John Day River, Rudio Mountain/Johnson Heights, and Dixie Creek areas. Increased user-created routes in these locations would result from increased OHV regulations that limit OHV seasonally, limit or prohibit OHV use in some areas, or limit the amount and location where designated routes and trails are located.

Other public or private lands may become used for OHV activities by OHV users in locations that may not follow BLM management direction, or may not be acceptable to private landowners.

However, the cumulative effects of OHV restrictions in each of Alternatives 2–5 would reduce the possibility and flexibility to provide, year-round OHV riding opportunities on designated routes and trails that do not conflict with non-motorized trail use, particularly in the Little Canyon Mountain OHV Area. This would be due to various OHV use restrictions that discourage or eliminate some or all types of OHV use.

**Table 4-25. Comparison of the Effects of Management Alternatives on Motorized and Non-motorized Recreation Opportunities and Development on BLM Lands in the Planning Area.**

Indicator	Alternative 1 No Action	Alternative 2 Preferred	Alternative 3	Alternative 4	Alternative 5
Managed Recreation Settings; Primitive; Back Country; Middle-Country; Front Country; Rural	River-based recreation only through John Day WSR Plan. WSA; Primitive; No other managed setting	River: same as Alternative 1. Uplands managed for motorized and/or non-motorized opportunities			
River Opportunities	Managed under the John Day WSR Plan				
Non-Motorized Opportunities	Managed opportunities in WSAs only	More opportunities than Alternative 1			
Cross-Country OHV Opportunities	Greatest opportunities	Less than Alternatives 1, 3; more than Alternatives 4, 5	Less than Alternative 1; more than Alternatives 2, 4, 5	Less than Alternatives 1, 2, 3; no OHV Open Areas	
Designated Route and Trail OHV Opportunities	Fewest opportunities. Users create routes and trails	More than Alternatives 1, 4, 5; less than Alternative 3	Most opportunities of any alternative	Less than Alternatives 2, 3; more than Alternative 1.	
Seasonal Motorized Restrictions	Smallest acreage and number of areas	More acreage and number of areas than Alternative 1			
Road Density Restrictions	None	May restrict motorized use. Exact location and mileage to be determined in 5 years			
OHV Open Area	Most acreage Open	Less Acreage Open than Alternative 1. 3,971-acre Rudio Plateau Open seasonally	Same as Alternative 2, except 598 acre Golden Triangle Open year-round	No OHV Open Area	
Class II Rock Crawl Area	User Created	Designated Areas			
Game Retrieval	Allowed where motorized use is authorized in Open Areas	Allowed on designated routes only. Cross-country use prohibited except seasonally on Rudio Mountain Plateau			
SRMA/ERMA Designations and Recreation Development	1 SRMA; 1 ERMA	5 SRMAs; 3 ERMAs			

**Table 4-26. Summary of Effects of Management Alternatives on Motorized and Non-motorized Opportunities and Development in Little Canyon Mountain SRMA.**

Indicator	Alternative 1 No Action	Alternative 2 Preferred	Alternative 3	Alternative 4	Alternative 5
<b>Recreation Trail Opportunities</b> OHV Trail System; OHV Class I, II, and III and non-motorized use.	<b>LUP: Open, Interim: Mixed;</b> Fewer opportunities for motorized use due to some OHV trail allocation to non-motorized users.	<b>Mixed;</b> Same as Alternative 1.	<b>Mixed;</b> Same as Alternative 1.	<b>Mixed;</b> Same as Alternative 1.	<b>Limited;</b> Same as Alternative 1.
<b>Daily and Weekly OHV Riding Opportunities</b>	<b>Open 24 hour/day;</b> Most OHV riding time of all alternatives; no time or day constraints.	<b>Use limited to 9 am to 6 pm;</b> OHV riding opportunities reduced to specific hours of the day; no constraints on OHV riding opportunities during day of week.	<b>Use limited to 9 am to dusk.</b> Same effects as Alternative 2.	<b>Use limited to 9 am to 6 pm Mon, Wed, Fri, Sat;</b> Fewest OHV riding opportunities due to reduced to specific hours of the day and specific days of week. Fewest OHV riding opportunities on a daily and weekly basis.	<b>Use limited to 9 am to 6 pm Mon, Wed, Fri, Sat;</b> Same effects as Alternative 4.
<b>Class I, II, and III OHV Use Opportunities</b>	<b>Play Areas:</b> N. Pit-Open to Class I and Class III OHV; No Class II opportunities S. Pit-Open to all OHV; Most OHV riding opportunities of all alternatives.	<b>Play Areas:</b> N. Pit-Use as parking area and trail head; No Class I, II, and III riding opportunities in this pit. S. Pit-Open to Class II OHV; No Class I or III riding opportunities.	<b>Play Areas:</b> N. Pit-Same as existing. S. Pit-Same as existing interim. Same effects as Alternative 1.	<b>Play Areas:</b> N. Pit-Closed; No Class I, II, or III riding opportunities. S. Pit-Same as existing interim; Same effects as existing alternative.	<b>Play Areas: Closed;</b> Most restrictive of all alternatives on OHV use. All OHV use opportunities lost.
<b>General Opportunities</b>	<b>Open;</b> More OHV cross-country riding opportunities available than all other alternatives.	<b>Limited to designated roads and trails;</b> Fewer OHV riding opportunities due to being restricted to designated routes and trails. May be opportunities for technical OHV trails and routes, due to managed and designed OHV trail and route system.	<b>Limited to designated roads and trails.</b> Same effects as Alternative 2.	<b>Limited to Class I and II. Limited to reduced number of roads and trails open to motorized travel.</b> Upper trails subject to seasonal closure. Fewest OHV riding opportunities, due to being restricted to designated routes and trails and seasonal use.	<b>Limited to reduced number of designated roads and trails.</b> Upper trails subject to seasonal closure; Same as Alternative 4.

**Table 4-27. Summary of Recreation Management Effects on Public Lands Recreation in the Plan Area by Alternative.\***

Indicators	Alternative 1 No Action. Continue Present Management	Alternative 2 Balances Resource Needs with Access Needs	Alternative 3 Emphasis Commodity and Public Use	Alternative 4	Alternative 5
<b>Recreation Setting</b>	River-based recreation management emphasis and unmanaged and non-motorized and non-motorized recreation emphasis allowing cross-country recreation use.	River-based recreation; same opportunities as Alternative 1. Managed motorized and non-motorized use on designated roads and trails. Recreation emphasis would provide more diversity of motorized and non-motorized recreation opportunities than Alternative 1.	More motorized recreation management emphasis than Alternative 2. All other effects same as Alternative 2.	Less motorized and more non-motorized recreation emphasis than Alternative 2. All other effects same as Alternative 2.	
<b>Special Recreation Management Area (SRMA)</b>	119,052-acre John Day SRMA would provide river based recreation opportunities. No other managed recreation settings in plan area; more conflicts with motorized and non-motorized users in the same areas due to no designated trails separating uses.	Higher quality motorized and non-motorized recreation opportunities within 5 SRMAs totaling 294,580 acres: John Day River, Bridge Creek, North and South Forks John Day River, and Little Canyon Mountain; less conflicts with motorized and non-motorized users through designated trail management.			
<b>Extensive Recreation Management Area (ERMA)</b>	One existing 337,559-acre ERMA; all public lands outside of the existing John Day River SRMA. Long term user conflicts continue.	Three ERMAs totaling 162,252 acres: Rudio Mountain, Dixie Creek and John Day Basin. Reduced user conflicts through designated route management.			
<b>Recreation Developments</b>	15 existing facilities provide access to river and public lands.	15 existing facilities provide access to river and public lands. Up to four new developments; North (2) and South Fork (1) John Day Rivers (1).	Same as Alternative 2, plus 598-acre OHV Open Area in the Golden Triangle and Seasonally Open 3,971-acre Rudio Mountain Areas. More OHV use opportunities over the long term than Alternative 2.	Lower OHV use opportunities than Alternative 2; no OHV use Area Development in the Golden Triangle and Rudio Mountain areas. All other effects same as Alternative 2.	

\*See Appendix K for a more detailed summary of SRMAs.

# Recreation Permits

## Introduction

Analysis of the environmental consequences of the alternatives on recreation permits considered the following key resources or resource uses: Vegetation (noxious weed control), Fire and Fuels, Wildlife, Wild Horses, Lands with Wilderness Characteristics, Special Designations (WSAs, ACECs, and RNAs), Paleontological Resources, Cultural Resources, Recreation Opportunities (special recreation management areas, recreation management, and OHV use) and Travel Management.

Indicators used to compare environmental consequences between alternatives include number of annual commercial permits available and number of commercial, competitive, educational, and organized group permits issued.

## Recreation Permit Indicators

- **Recreation Opportunities:** The types, levels of satisfaction, and amount of area available for various recreation activities. The changes in recreation opportunity by alternative are the same for recreation permits as those discussed under non-guided recreation in general.

## Recreation Permit Assumptions

- The actual number of recreation permits would be determined later.
- The number of available permits includes permits currently administered by BLM within the plan area, as well as permits that are currently unfilled.
- The number of available permits allotted for an activity or use area may be greater or less in number than the current demand for permits.
- Authorized BLM permit holders help protect natural resources because they are held accountable for good stewardship of public lands and they assist the BLM in spreading Leave No Trace and Tread Lightly messages to the general public.
- Requiring upland groups over 12 in number to inquire with the BLM to determine whether a permit is required would allow BLM to discuss resource concerns with the group leader, mitigate these concerns if possible, steer organized groups to areas that can best accommodate their use, and notify groups if a permit is required prior to use of the public lands.

## Analysis of the Effects of the Alternatives on Recreation Permits

Unless discussed below, actions proposed under any alternative would have no measurable effect on recreation permits at the planning scale.

### Vegetation Management, Noxious Weed Control, Fire and Fuels Management, and Wild Horse Management Effects on Recreation Permits

Under all alternatives, treatments to restore and rehabilitate public lands would increase commercial recreation opportunities in the long term by improving the condition of the public lands, but may result in temporary disruption to some commercial activities or use areas.

### Wildlife Management Effects on Recreation Permits

Under all alternatives, seasonal road closures would have the same effect on recreation permits as on recreation in general.

### Special Designations (WSAs, ACECs, RNAs) Effects on Recreation Permits

All special designations include management actions designed to protect resources or experiences. These management actions include restrictions on guided and/or non-guided recreation activities in areas containing

these resources. As a result of these actions, the number and type of permits issued would be reduced most under Alternatives 2, 3, and 5, less under Alternative 4, and least under Alternative 1.

### **Lands with Wilderness Characteristics and Paleontological and Cultural Resources Effects on Recreation Permits**

Existing management designed to protect paleontological and cultural resources to be continued in all alternatives would continue existing restrictions on guided and/or non-guided recreation activities in these areas. Additional management designed to protect wilderness characteristics in Alternatives 2–5 would include restrictions on guided and/or non-guided recreation activities in these areas.

### **Special Recreation Management Areas Effects on Recreation Permits**

Existing management goals identified for the John Day River SRMA to be continued in Alternative 1, plus management goals identified for additional SRMAs and ERMAs in Alternatives 2–5 would be factors the BLM considers when evaluating a proposal for a commercial recreation permit. To be considered, a permit proposal must be in compliance with management goals for the SRMA or ERMA where the activity is proposed.

### **Recreation Management Effects on Recreation Permits**

Continuing the existing moratorium on new commercial permits in Alternative 1 would not address the backlog of permit requests that BLM has received and continues to receive for the plan area. Discontinuing the moratorium in Alternatives 2–5 would create opportunities for new annual upland-based commercial permits as the BLM addresses the backlog of NEPA analyses required for permit issuance. The availability of new upland-based commercial permits would provide more options for recreation users to participate in guided recreation activities authorized by the BLM, provide increased (but not unlimited) business opportunities for those wishing to offer a guide service, and help address unauthorized guiding on BLM lands by making legal alternatives available.

Criteria and objectives under Alternatives 2–5 increase the risk of future decisions limiting the number or type of commercial permits available in a given area and/or place restrictions on the permitted use such as number of use days, group size, area of use, or mode of transport. Permit availability may be limited by the BLM's ability to administer and monitor permits. The availability of upland-based commercial permits would be expected to gradually increase from the current level of 12 (includes 9 unfilled bighorn sheep guiding permits) to approximately 35.

### **Wild and Scenic River Management Effects on Recreation Permits**

The existing management of the Wild and Scenic River Plan is carried forward under all alternatives. The change to recreation permits follows the general recreation effects by alternative.

### **Travel and OHV Management Effects on Recreation Permits**

Existing travel management actions to be continued in Alternative 1, plus additional travel management actions as proposed in Alternatives 2 and 3, would have the same effect on recreation permits as on recreation in general.

### **Cumulative Effects on Recreation Permits**

With an increasing central Oregon population and the accompanying popularity of recreating within the plan area, there is likely to be an increase in the demands for permits, thereby increasing the need for BLM to process, administer and monitor permits.

# Access and Travel Management

## Introduction

Analysis of the environmental consequences of the alternatives on access and travel management considered the following key resources or resource uses: Soils, Vegetation Management (forestry), Fire and Fuels Management, Aquatic Resources, Wildlife, Visual Resources, Special Designations (ACEC), Livestock Grazing, and Recreation Opportunities (OHV use).

The following indicators were used to compare and assess the effects: miles of interim roads, miles of roads closed, miles of interim road seasonally open, miles of interim roads open year round, and average road densities across BLM lands. The assumptions underlying these indicators are described below.

## Access and Travel Management Assumptions

- The interim transportation system would be managed and maintained until the completion of a Transportation Plan within 5 years of the ROD for this RMP.
- Within WSAs and areas being protected for their wilderness characteristics, motorized use is either closed or limited to designated routes to protect the wilderness characteristics of these areas. Wilderness legislation prohibits mechanized travel within a wilderness area. When a WSA is designated by Congress as Wilderness, existing routes within that area would be closed to mechanized travel and are not available for transportation network.
- Not all public land can be legally accessed by the public (e.g., Federal lands that are landlocked by private landowners without any public access routes or easements). Road mileage calculations do not always differentiate between mileage with or without legal public access.
- Across BLM land within the plan area, there are 109 miles of roads whose jurisdiction is outside of BLM's control. These routes belong to the state, county, or another agency and the public can use them to access public land; they are only used for cumulative effects analysis.
- Routes with administrative easements across private lands are closed to public access.
- Most right-of-way routes and public easement routes are open for public use without seasonal restrictions.
- Road closure proposals not currently identified in this planning document would undergo additional environmental review with associated public input.
- The BMPs would be utilized for construction, rehabilitation, maintenance and general management of the transportation system (Appendix B). These BMPs would be consistent across all alternatives.
- The BMPs for the following resources would have no measurable impact on the transportation system: Weeds, Special Designations, Vegetation, Aquatic Resources (Fisheries).
- Average Daily Traffic (ADT) is the summation of the number of trips in and the number of trips out of an area.
- Reserved Forage Allotments (RFA) will be treated as open allotments when analyzing impacts to the transportation system. An isolated grazing allotment is one that requires traveling across a private land holding to gain access (i.e., no administrative easement across the private land holding).

## Analysis of Effects of the Alternatives on Access and Travel Management

### Effects Common to All Alternatives

Proposed management of the following resources and resource uses would not have measurable impacts to Access and Travel Management: Wild Horses, Lands with Wilderness Characteristics, Cave Resources, Special Designations (WSRs), Native American Uses, Paleontological Resources, Cultural Resources, and Recreation Opportunities (visitor services) at the planning scale.

## Access and Travel Management Effects on Access and Travel Management

Under Alternative 1, continuation of current transportation system would have no new effects on maintenance or degree of public access.

Alternatives 2, 4, and 5 would be based on meeting resource goals and objectives, while balancing cultural, ecological, and social and economic values. There would be 86 miles of BLM road that would continue to be maintained for passenger vehicles. In addition, 109 miles of primitive routes would receive minimal maintenance, as needed, and would limit motorized access to high clearance/4x4 vehicles. Only 5 miles of new road construction are proposed, and 36 miles of road would be permanently closed for hydrologic concerns. Approximately 46 miles of road would be identified for pursuing easements to gain access to large blocks of land-locked public lands.

Under Alternatives 2, 4, and 5, there would be 409 miles of roads (55%) not designated as part of the interim transportation system, effectively reducing access to public lands. However, 241 of the 250 miles to be closed are short segment routes that are landlocked by private land holding with no public access rights. This results in 27% of existing routes being closed to the public until a Travel Management Plan can be completed.

Under Alternatives 2, 4, and 5, the interim road system meets the road density limits for 5 of 6 subareas (Table 4-28) and would allow routes to be added for OHV trails, rights-of-way, and other uses in all subareas except the Upper John Day. In the Upper John Day, the road density would need to be reduced on average by 0.40 miles per square mile, or approximately 6 miles.

Alternative 3 emphasizes recreation and public uses of public lands. Approximately 137 miles of currently closed routes would be reopened in the North Fork John Day area as part of the interim transportation system. Increased access could increase as well as maintenance costs in the North Fork John Day area. Under Alternative 3, there would be 662 miles of primitive routes that would receive minimal maintenance on an as-needed basis, which would limit motorized access to high clearance/4x4 vehicles. The miles of roads maintained for passenger vehicles, miles of proposed easements and miles of road proposed for construction would be the same as Alternative 2. Route closures would be limited to WSAs and routes identified as hydrologic concerns. The total mileage of roads proposed for closure due to hydrologic concerns is 36 miles. Similar to the existing situation, Alternative 3 would have over 250 miles of road only accessible through private lands without public access; trespassing across private lands would continue as the public tries to access public lands. This may also lead to private landowners locking off their property and effectively closing access to public lands.

For the final transportation plan, Alternative 3 would be similar to Alternative 1 in the North Fork John Day area, except it would require modifying which roads are reopened to meet road density requirement. Instead of reopening 137 miles in the North Fork John Day area, the amount would be 103 miles or less. In Lower John Day, South Fork John Day and Rudio Mountain subareas, additional routes could be added for OHV trails, rights-of-way, and other uses.

**Table 4-28. Road Density Values by Alternative for Six Subareas Within the Plan Area, Along With the Average Prescribed Road Density Limits (mi/mi<sup>2</sup>).**

Subarea	Average Prescribed Road Density Limit		Existing Road Density Alternative 1	Proposed Road Density	
	Alternatives 2, 3, and 5	Alternative 4		Alternatives 2, 4, 5	Alternative 3
Upper John Day	1.48	1.48	3.5	1.5	3.5
Lower John Day	1.17	1.17	1.2	0.4	1.1
North Fork John Day	1.83	1.83	0.6	0.8	2.3
Rudio Mountain	1.81	1.63	1.4	0.4	1.4
South Fork John Day	1.65	1.39	1.7	0.6	1.6
Sutton Mountain	0.96	1.48	1.3	0.7	1.3

## **Fire and Fuels Management Effects on Access and Travel Management**

Routes heavily used by fire equipment are likely to be temporarily damaged; however, fire rehabilitation efforts would correct damaged roadbeds. During prescribed fires and wildfire containment, some routes would likely be temporarily closed to the public, or temporarily opened to assist in firefighting efforts.

Under existing management (Alternative 1), fuels treatments would be applied to 3,600 acres annually, resulting in short-term traffic increases on 8 miles of road annually.

Alternatives 2, 4, and 5 have a full range of appropriate response (including fire to achieve resource objectives) available for areas outside of WUI. The impacts to the transportation system would vary. When the appropriate response is to monitor or point control, impacts to routes would be minimal. When the appropriate response is perimeter control or full suppression, road use and public safety concerns during fire suppression activities may cause temporary closure or temporary opening of closed routes. There are 706 miles of roads within the 434,306 acres of appropriate response zone. The management of wildfires within the 85,391 acres of designated WUI areas would not change, nor would the impacts to the 139 miles of roads within the WUI. Fuel treatments would occur on 5,400 acres annually, resulting in short-term traffic increases during fuel treatment activities on 9 miles of road annually.

## **Cultural Resources Effects on Access and Travel Management**

For Alternative 1 and the action alternatives, areas where site-specific monitoring reveals cultural resource concerns, road construction, rehabilitation and maintenance activities are likely to be restricted or mitigation measures applied to the activity.

## **Energy and Minerals Leases Effects on Access and Travel Management**

For Alternative 1 and the action alternatives, areas developed for energy or minerals (including leasable, locatable, and salable minerals); there exists the potential for site-specific access needs. A right-of-way would be provided and the BLM would dictate the location and design standards for these routes. The action alternatives would have less area unconstrained for energy development than Alternative 1 (Table 2-14), and thus may result in fewer site-specific actions related to access.

## **Lands and Realty Effects on Access and Travel Management**

For Alternative 1 and the action alternatives, potential land acquisition could add road mileage to the system, while land suitable for disposal could reduce the road mileage. In addition, the granting of rights-of-way could increase the mileage of routes available across public land. The BLM would dictate the location and design standards for any right-of-way road permit. Many of the right-of-way permitted roads are maintained by lessees. Recreation and Public Purposes (R&PP) leases on lands near municipalities may decrease the mileage of routes available for public use.

## **Livestock Grazing Management Effects on Access and Travel Management**

Traffic associated with daily grazing management activities is estimated at two vehicles per day Average Daily Traffic (ADT) per allotment during the grazing period for each road that accesses an allotment. For every isolated grazing allotment that is closed, the ability to access these allotments for other management purposes is eliminated. In many cases, only administrative access to these tracts of land would be available because of the grazing allotment. As grazing leases are renewed, there would be an opportunity to allow the grazing lessees to maintain BLM roads as a stipulation to the lease.

Under current management (Alternative 1), 221 allotments are open and 9 allotments are closed. For these allotments, the truck-hauling traffic is estimated at 221 round trips per year on the roads accessing the allotments. Currently only one allotment is open in the North Fork John Day area, which has negligible impact on traffic in the area.

Under Alternative 2, up to two grazing allotments in the North Fork John Day would have the potential to be leased as Reserve Forage Allotments (RFA). As a result, truck-hauling traffic would see minor increases of up to four round trips per year on the roads in this area. Daily grazing management activities would increase local traffic counts to the area. The ADT increase during the grazing period would be approximately 4 vehicles per day

on the North Fork John Day Road and less on the side roads. The increase in traffic, especially during wet periods, would cause additional damage to the roads and result in increased maintenance needs.

Under Alternative 3, up to 10 grazing allotments in the North Fork John Day would be leased. As a result, truck-hauling traffic would see minor increases of up to 20 round trips per year on the roads in this area. Daily grazing management activities would increase local traffic counts to the area. The ADT increase during the grazing period would be approximately 20 vehicles per day on the North Fork John Day Road and less on the side roads.

Under Alternative 4, an estimated 145 of the 210 allotments would have the potential for closure if the permits are relinquished. Traffic would decrease by two ADTs for every grazing allotment closed. Road maintenance would decrease as would the number of cooperative agreements to allow grazing lessees to maintain BLM roads.

### **Soils Effects on Access and Travel Management**

Under Alternative 1, the Best Management Practices recommended for road maintenance and construction activities are not specific to the plan area, so they may not be effective in minimizing excess erosion. Under this alternative, 253 miles of roads are classified as having excessive erosion (0.75 pounds per feet average annual erosion rate).

Under the action alternatives, roads with excessive erosion would receive rehabilitation, decommissioning, or obliteration when any new roads are constructed. Best Management Practices and guidelines would be tailored to the plan area and would minimize erosion. For interim routes, maintenance intensities would temporarily be adjusted on these routes to a level where excessive erosion can be controlled and maintained at acceptable levels.

In Alternatives 2, 4, and 5, only 19 miles of the interim road system have excessive erosion. The other 234 miles of roads with excessive erosion are not part of the designated interim system and may not require any further actions beyond closing the road.

In Alternative 3, there would be 132 miles of the interim road system that would have excessive erosion. Like the other action alternatives, roads that are not part of the designated interim system may not require any further actions above closing the road.

### **Areas of Critical Environmental Concern (ACEC) Effects on Access and Travel Management**

Within Alternative 1, there are 6,332 acres designated as ACECs. There are approximately 10 miles of roads within these ACECs. Traffic within these areas is restricted to the designated roads. This restriction has had minimal impact to the maintenance of these roads.

Under the action alternatives, the area proposed for ACEC designation would be increased to 68,404 acres. Within the boundaries of these proposed ACECs are 111 miles of roads where traffic would be restricted to the designated routes. Maintenance and construction of roads within ACEC boundaries is likely to be restricted by the VRM classification of the individual ACEC. Rights-of-way for private land-holding access would be restricted to existing routes and allow the BLM to have the right-of-way holders maintain these roads.

### **Visual Resources Management Effects on Access and Travel Management**

For Alternative 1, Table 4-29 shows the acreage of existing VRM Classes within the plan area and the mileage of roads within those areas. Very limited road maintenance activities are allowed in VRM Class I. In VRM Class II, road maintenance and construction activities cannot attract attention and changes cannot be evident in the character of the landscape. In VRM Class III, road maintenance and construction can occur, but its evidence is subordinate to the character of the landscape. In VRM Class IV, road maintenance and construction activities are allowed.

For the action alternatives, Table 4-30 shows that across the landscape, the only changes in VRM class would be within the acquired lands of the North Fork John Day area and likewise, the only impacts to the transportation systems would be for those roads within this area. VRM in Alternative 4 varies slightly due to additional areas managed for protection of wilderness character; however, there are no roads in these areas.

**Table 4-29. Existing Visual Resource Management (VRM) Classes and Road Miles Within VRM Class.**

VRM Classes	BLM Acreage within Plan Area	BLM Road Miles within VRM Class
I	95,893	158
II	103,645	0
III	174,989	0
IV	82,306	136

**Table 4-30. Visual Resource Management (VRM) Classes and BLM Road Miles Within VRM Classes for the Action Alternatives.**

VRM Classes	BLM Acreage within Plan Area	BLM Road Miles within VRM Class
I	95,893	158
II	160,199–164,574	237
III	150,994	266
IV	49,285	82

### Recreation Opportunities Effects on Access and Travel Management

Under Alternative 1, there are 337,559 acres designated as ERMA, with no impacts to the 658 miles of road within this area. There is currently only one SRMA. The Lower John Day River SRMA is 119,052 acres and includes the Spring Basin, Thirtymile, North Pole Ridge, and Lower John Day WSAs. Within this SRMA, all traffic is limited to designated roads and trails and no cross-country travel is allowed. Using a reduced road density of 0.5 mile per square mile to account for the large roadless areas within the WSAs, travel is currently limited to approximately 93 miles of road.

With implementation of benefits-based recreation criteria for the action alternatives (see Recreation, Chapter 2), the level and type of access available for public use would vary based on the setting for each SMRA. In the 104,954 acres designated as a Primitive setting, no new roads would be constructed. These areas are roadless. In the 29,500 acres (in Alternatives 2, 3, and 5) and the 37,511 acres (in Alternative 4) designated as Back Country setting, there are 42 miles of existing routes that if not already closed could be converted to non-motorized trails. New construction would be limited to trails. Road rehabilitation, construction, and maintenance activities are allowed in Middle Country, Front Country, and Rural settings. These three settings allow for motorized access. In the 155,011 acres (in Alternatives 2, 3, and 5) and 147,000 acres (in Alternative 4) designated as Middle Country, the 355 miles of roads are more primitive. Typically, these minimally maintained primitive routes have native surface and are passable to high clearance 4x4s and OHVs. The 8 miles of roads through Front Country (1,949 acres) and Rural (2,617 acres) settings range from primitive roads to those that are maintained to be passable to passenger vehicles.

For Alternative 1, continuation of existing OHV management would have no new effects on the maintenance and degree of public access. Currently, 234,272 acres are designated as Open, which allows the user to travel anywhere within that area. Within the 155,228 acres designated as Limited, OHV use is concentrated on 213 miles of roads. Only 67,332 acres are currently closed to OHV use, amounting to 109 miles of roads experiencing no use.

In Alternative 2, OHV users would be allowed off-road on 3,971 acres in the Rudio Mountain area. Within this open area, 14.9 miles of roads would have less deterioration from use as travel is dispersed across the landscape rather than being concentrated on the roads. Elsewhere within the planning area, maintenance needs would increase for 384 miles of roads resulting from concentrated OHV use. There would be 138,732 acres closed to OHV use, amounting to 138 miles of roads that would experience no use. With the reduction in Open designated areas, the number of OHV user-created routes would decrease across the landscape.

Alternative 3 is similar to Alternative 2 with the exception that an additional 600 acres would be designated as Open.

In Alternative 4, only two acres are designated as Open, reducing the likelihood of user-created routes to a no effect on the transportation system. The area designated as Limited is essentially the same as Alternative 2. The acres designated as Closed would increase to 155,325 acres resulting in 149 miles of roads with no OHV traffic.

In Alternative 5, there would be no lands designated as Open to OHVs. The Limited designated land would increase to 315,020 acres resulting in concentrated use on 604 miles of roads. Maintenance needs would increase for 391 miles of roads resulting from concentrated OHV use. The amount of closed roads would be the same as Alternatives 2 and 3. In the Little Canyon Mountain area near John Day, Oregon, 2.3 miles of road would be limited to highway legal vehicles only. Motor vehicles that are not highway legal would not be able to utilize any of the interim routes in this area, but would be able to utilize other interim routes within the planning area.

### **Vegetation Management (Forestry) Effects on Access and Travel Management**

The identified haul routes associated with individual forest products sales would increase traffic, particularly traffic associated with the timber harvest activities. Impacts related to this increased traffic are typically offset by requiring the purchaser to either improve the road prior to hauling activities and/or maintaining the road throughout the hauling activities.

Currently under Alternative 1, the existing allowable timber cut is 3.58 mmbf per year and the estimated traffic volume associated with hauling these forest products is 796 round trips. For the action alternatives, the allowable cut is 2.54 mmbf per year. The estimated traffic volume associated with hauling is 565 round trips and traffic would decrease by 231 round trips; likewise, the maintenance needed on the designated haul routes would decrease.

### **Wildlife Management Effects on Access and Travel Management**

Alternative 1 would have 45 miles of roads with seasonal closures for wildlife. These roads are mostly in the South Fork John Day, North Fork John Day, and Battle Creek areas. Under the action alternatives, seasonal wildlife closures would apply to all routes, except the following collector roads: Franks Creek, Holmes Creek, South Fork John Day, Priest Hole, Deer Creek, Sunflower Creek, Murderer's Creek, and Indian Creek. With no traffic between December 1 and March 31, maintenance needs would decrease. Mitigation measures and seasonal work windows would be applied to construction and maintenance activities as needed. In Alternatives 2, 4, and 5, there would be 138 miles of roads (41% of the designated interim routes) open seasonally. In Alternative 3, there would be 475 miles of roads (54% of the designated interim routes) open seasonally.

### **Aquatic Resources Effects on Access and Travel Management**

Activities conducted to protect aquatic habitat (e.g., altering or closing stream crossings and habitat restoration) are likely to temporarily or permanently affect public access and road maintenance. Under Alternative 1, the current PACFISH objectives would provide guidance on these road-related activities.

Under the action alternatives, 36 miles of roads would be closed to motorized public use due to hydrologic concerns. In addition, when the ACS decision tree is applied to individual roads, there is likelihood that some roads would require rerouting or upgrading to protect aquatic concerns. A route closed to motorized use due to hydrologic concerns may still provide non-motorized public access to the area.

### **Wilderness Characteristics Protection Effects on Access and Travel Management**

Under Alternative 4, approximately 2.5 miles of future proposed road construction within Rudio Mountain would be eliminated because 1.3 miles of this road would be located within lands where wilderness characteristics are to be protected. By eliminating this segment of road, the BLM will not be able to provide a contiguous public access route between Franks Creek and Holmes Creek Roads. With the allowable road density held at 0 miles per square mile in areas with wilderness characteristics protections, the prescribed road density standards are lower for the Rudio Mountain (10% lower) and South Fork John Day (16% lower) sub areas, thus reducing the miles of routes that can be developed in these sub areas.

## Summary of Effects on Access and Travel Management

In all alternatives a portion of the transportation system could only be accessed by obtaining permission from adjacent landowners. Without public easements across these private lands, there would be no legal access to the public lands for the general public.

Under Alternative 1, the transportation system would continue to be managed by current practices. Maintenance and construction activities are controlled by resource BMPs. The transportation system includes 250 miles of roads with no legal access and 45 miles of seasonally opened roads. There are 475 miles of roads classified as primitive that are only accessible to high clearance vehicles.

In the action alternatives, the identified transportation system is an interim system only. A Transportation Management Plan would be developed 5 years after this RMP is completed to address the final transportation system on a site-by-site basis. The determination of which roads are part of the final transportation would be based on the criteria listed in Chapter 2, while remaining within the average prescribed road density limit. In addition, the BLM has identified desired road easements to gain more public and administrative access to public lands. These future road easements would depend on the willingness of private landowners to enter into access agreements.

Alternatives 2, 4, and 5 would have reduced road access and lower maintenance costs when compared to Alternative 1. Roads that did not have legal access were not included in the interim transportation plan which accounts for the reduced access and decrease in maintenance. Average road density standards are lower than the existing road densities.

Alternative 3 would be similar to the current level of access and maintenance, except more miles of road would be under seasonal use restrictions from December through April. Many of these routes are snowed-in during this time frame. The increase in the mileage of interim routes available for public access is the result of lifting some of the closures in the North Fork John Day area. Average road density is similar to Alternative 1, except in the North Fork John Day area.

## Cumulative Effects on Access and Travel Management

Population growth in central Oregon and the Willamette Valley, as well as more interest in OHV and mechanized vehicle use, recreation, and tourism, could result in increased motorized use of the plan area in the reasonably near future. Increased visitation and motorized use within the plan area would have cumulative effects on transportation including higher maintenance costs, increased route closures, monitoring and mitigation actions, and more traffic rule enforcement. If maintenance funding is reduced, then the frequency of maintenance that these routes receive would likewise be reduced. In some cases, this reduced level of maintenance may restrict the type of vehicles that can safely travel on a particular route.

The closure of routes and seasonal use restrictions in Alternatives 2, 3, 4, and 5 would cause increased traffic on non-restricted routes and would result in higher maintenance associated with these routes. Routes across private lands that have traditionally been used by the public are continuing to be closed by private landowners due to damage to private lands or change of ownership, thus increasing use on other routes. Likewise, the adjacent National Forest lands are changing their travel management by restricting all motorized use to designated routes or Open areas. Without the opportunity for Open cross-country use, the number of user-created routes would be reduced. With the majority of the traffic being concentrated on a smaller transportation system, wear and tear on roads, such as those that connect with National Forest roads, would increase as would the associated maintenance costs.

Protection of resources dictates increased management, which inevitably requires stricter controls on access and user numbers, thus minimizing cumulative effects in some areas and concentrating effects on the major collector routes. Implementation of BMPs for transportation actions (Appendix B) should also minimize cumulative effects within the plan area under all alternatives.

Acquiring additional road easements to provide public access to land-locked public parcels would provide short-term relief to increased visitation in some areas. In the long term, however, the cumulative effects of these additional roads on transportation would include higher maintenance costs, increased route closures, monitoring and mitigation actions, and more traffic rule enforcement.

## Energy and Mineral Resources

This analysis examines the availability, quantity, and abundance of energy and mineral resources under each alternative relative to demand.

### Energy and Mineral Resources Indicators

- **Acres of land that would be available, avoided, or excluded from wind energy development.** An interdisciplinary team identified areas where resource uses or values can be adequately protected with terms and conditions and classified those areas as 'available.' Terms and conditions would be selected to meet RMP objectives. The team then identified areas where resource uses or values could conflict with wind energy development, and wind energy and development should be avoided. However, in these areas it may be possible to allow wind energy development with additional terms and conditions for the identified resource uses and resources. Terms and conditions would be selected to meet RMP objectives and the protections listed in Table 2-14. Finally, the interdisciplinary team identified areas where other resource uses or values cannot be adequately protected with even the most restrictive terms and conditions. Appropriate protection can be ensured only by excluding these lands from wind energy development. A GIS analysis of the available, avoided, or excluded areas were compared to areas with various wind energy potential and used as an indicator of the effects to potential wind energy development by alternative.
- **Acres where mineral material disposal (salable) would be available, avoided, or closed.** An interdisciplinary team identified areas where mineral material disposal could occur and resource uses or values can be adequately protected with stipulations. Those areas were classified as 'available.' Stipulations and BMPs would be selected to meet RMP objectives. The team then identified areas where resource uses or values could conflict with mineral material disposal and should be avoided. However, in these areas it may be possible to allow mineral material disposal with additional stipulations for the identified resource uses and resources. Additional stipulations would be selected to meet RMP objectives and the protections listed in Table 2-14. Finally, the interdisciplinary team identified areas where mineral material disposal cannot occur because other resource uses or values cannot be adequately protected with even the most restrictive stipulations. Appropriate protection can be ensured only by excluding these lands from mineral material disposal. A GIS analysis of the mapped resource uses and values were compared to areas with various mineral materials potential and used as an indicator of the effects to mineral material availability across the plan area.
- **Acres where leasable (including geothermal) solid and fluid minerals would be available, avoided, or closed.** An interdisciplinary team identified areas where leasing could occur and resource uses or values can be adequately protected with terms, conditions and stipulations. Those areas were classified as 'available.' Terms, conditions, stipulations and BMPs would be selected to meet RMP objectives. The team then identified areas where resource uses or values may conflict with leasing and should be avoided. However, in these areas it may be possible to allow leasing with additional terms, conditions, and stipulations for the identified resource uses and resources. Additional terms, conditions, and stipulations would be selected to meet RMP objectives and the protections listed in Table 2-14. Finally, the interdisciplinary team identified areas where leasing could not occur because other resource uses or values cannot be adequately protected even with the most restrictive stipulations. Appropriate protection can be ensured only by excluding these lands from leasing. A GIS analysis of the mapped resource uses and values was compared to areas with leasing potential and used as an indicator of the effects to leasable mineral availability across the plan area (geothermal, oil, and gas).
- **Acres where locatable mineral mining would be available, avoided, or closed via withdrawal.** An interdisciplinary team identified areas where locatable mineral mining can occur and resource uses or values can be adequately protected with terms, conditions, and other special considerations. Those areas were classified as 'available.' Terms, conditions, and BMPs would be selected to meet RMP objectives. The team then identified areas where resource uses or values may conflict with locatable mineral mining and should be avoided. However, in these areas it may be possible to allow locatable mineral mining with additional terms, conditions, and additional considerations for the identified resource uses and resources. Additional terms and conditions would be selected to meet RMP objectives and protections listed in Table 2-14. Finally, the interdisciplinary team identified areas where locatable mineral mining

is unsuitable because other resource uses or values cannot be adequately protected with even the most restrictive stipulations. Appropriate protection can be ensured only by withdrawing these lands from locatable mineral exploration or development. A GIS analysis of the mapped resource uses and values were compared to areas with various locatable mineral potential and used as an indicator of the effects to locatable mineral availability across the plan area.

## Energy and Mineral Resources Assumptions

- The wind energy development allocations are coincident with rights-of-way allocations. As a result, rights-of-way restrictions should not limit wind energy development.
- Over the last two years, interest in wind energy development has expanded due to improvements in technology and increasing demand. As a result, even areas with only 'fair' wind energy potential may be developed in the future.
- For analysis purposes, it is assumed that adjacent ownership on isolated parcels would allow access for wind energy development. In addition, it is assumed that development on areas available for wind energy development would be developed in conjunction with agreements with state and local governments.
- The analysis of energy and mineral (locatable, leasable, salable, and geothermal) availability is to display effects of the alternatives. Site-specific decisions on energy and minerals will follow guidance from Chapter 2 and site-specific information on resources and mineral and energy potential.

## Analysis of Effects of the Alternatives on Energy and Mineral Resources

### Effects Common to All Alternatives

All five alternatives would maintain similar levels of availability and quantity of energy and mineral resources. Under all alternatives, mineral and energy resources on public land within the plan area would generally be abundant relative to the anticipated demand. With the new emphasis on renewable energy, an increase of application for wind energy development and geothermal energy is possible.

Under federal law and BLM policy, all public lands are open for energy and mineral exploration and development, unless specific lands are excluded, closed, or withdrawn from mineral entry. An example of such a withdrawal is the establishment of a federal wilderness such as Spring Basin Wilderness. All five alternatives would provide opportunities for new exploration for all types of minerals. Despite some differences between alternatives in constraints on mineral and energy development (Table 2-14), most of the plan area would remain open to mineral entry. Such entries would be subject to certain restrictions as required by law, land use plan compliance, or as a result of decisions supported by site-specific environmental analysis.

### **Locatable**

The BLM has subsurface ownership of over 1.9 million acres in the plan area. Of this acreage, the BLM only manages the surface of 158,437 acres. Under all alternatives, almost all BLM's locatable minerals would remain available for the location of mining claims under the mining laws, but most on-the-ground mining activities near riparian areas would require site-specific review by an interdisciplinary team to determine if the proposed impacts would meet ACS standards. Where BLM manages the surface and subsurface locatable minerals, approximately 80% of the high potential areas are available for mining under all alternatives. Current levels of mining could be accommodated under all the alternatives. With possible national, local, and regional market changes, additional removal of material could occur in the areas allocated for mineral use.

### **Leasable**

Under all alternatives, almost all oil, gas, and geothermal energy would continue to be available for leasing and the exploration and development.

Although prices for oil and gas are expected to continue to rise relative to the costs of exploration and development, the actual physical occurrence of oil and gas in most parts of the plan area is speculative and largely

dependent on results of current exploration drilling occurring in south-central Washington. A few federal oil and gas leases have been issued within the plan area since the current resource management plans were adopted from 1986 through 1989. Lands in the central portion of the plan area follow the Blue Mountain Anticline (see Chapter 3) and have the best potential to attract leasing and exploration interest for conventional oil and natural gas deposits. However, there were no bids on the plan area leases offered in 2009.

### **Wind Energy**

All action alternatives were developed in consideration of the National Wind Energy Programmatic EIS and decision document (USDI 2005f). This document addressed wind energy development, including adoption of the programmatic policies and BMPs. The BLM followed programmatic decisions to provide for wind energy development and to identify minimum requirements for mitigation measures. The Record of Decision also states that right-of-way authorizations will not be issued for wind energy development on lands where wind energy development is incompatible with specific resource values. The plan area restrictions developed by an interdisciplinary team are displayed in Table 2-14 and vary from 'avoid' to exclude.

Although approximately 93% of the BLM land in the plan area has only poor to marginal wind energy potential, 7% has 'fair' to 'superb' wind energy potential. Of the BLM's 21,111 acres with at least 'fair' wind energy potential, Alternative 1 allocates 13,410 acres and the action alternatives allocate 8,475 acres as available for development. The action alternatives slightly reduce the area available for wind energy development based on the findings of resource impacts that cannot be mitigated, and adds plan area specific terms and conditions. Over the life of the plan, project-specific analyses would focus just on the critical, site-specific issues of concern.

### **Salable**

Under all five alternatives, common varieties of rock would continue to be available. Approximately 35-40% of the BLM lands with high potential for salable mineral development would be existing or new mineral material disposal. The action alternatives include additional BMPs, mitigations, and guidelines designed to meet other resource and resource use objectives.

Within the plan area, there are several existing quarries for common variety minerals. It is assumed that few of these quarries would be depleted over the life of this plan and therefore do not need replacement. A few quarries may be closed, reclaimed, or potentially replaced by new sites. Demand for common variety material is closely correlated with population growth and road maintenance needs. The expansion of some existing quarries or the opening of new sites may be allowed if circumstances change, demand outpaces current supply, and RMP objectives for other resources and uses are met.

### **Cumulative Effects on Energy and Mineral Resources**

Site-specific and/or quantitative analyses of cumulative effects are not possible due to the uncertainty of when and where mining operations or energy production would be authorized within lands open to that use. Under the current administration, renewable energy development is strongly supported but includes constraints of being compatible with other resources. The Blue Mountain National Forests are currently redoing their land use plans and additional restrictions are likely to be placed on energy and mineral development based on new science and increased public concern for resource protection. Reclamation requirements and the designation of avoidance and exclusion areas in this plan would cumulatively add to present and future restrictions on all these activities. Although fewer areas may be available, new technologies and current emphasis is likely to result in more actual construction and/or development than has occurred in the past. Adjacent private lands are developing energy projects, especially wind development projects and will cumulatively add these types of projects to the planning area. The BLM lands in the basin are likely to see an increase in the amount of development of energy projects due to demand and new technologies. However, the BLM would remain a minor supplier of these resources throughout the basin based on the scattered land pattern and restrictions.

### **Locatable**

Only 6% of the plan area has high potential for locatable minerals. The BLM has subsurface ownership of only 0.15% of the plan area with high potential for locatable minerals. As a result, none of the alternatives would unreasonably restrict the exploration or development of locatable minerals across the plan area.

### **Leasable**

The entire plan area contains over 2.3 million acres of land with high potential for subsurface oil, gas, and geothermal energy. Although BLM owns almost 40% of these lands, the BLM manages only 13% of the surface of these lands and restricts development on only 6 to 7% under all alternatives. As a result, none of the alternatives would unreasonably restrict the exploration or development of leasable minerals and geothermal resources across the plan area.

### **Wind Energy**

Wind energy potential is greatest in the northern portion of the plan area and along the Columbia River. This has also been the focus of recent wind energy development on private land. The BLM has identified multiple utility and transportation corridors that stretch east and west across this northern portion of the plan area to transport electricity across the region.

Almost 372,146 acres of the plan area have at least 'fair' potential for wind energy development. Management responsibility for these areas is as follows: private ownership (75%), USFS (18%), BLM (6%), and Bureau of Indian Affairs (1%). Under all alternatives, approximately 2 to 3% of the BLM's 6% is available for wind energy development. Although the BLM does not account for a major share of the wind energy potential, this allocation, in combination with the identification of areas suitable for major transmission lines, would enable future wind energy development in the plan area.

### **Salable**

Within the plan area, over 3.3 million acres have high potential for salable minerals. The BLM manages approximately 3% of these high potential areas. As a result, none of the alternatives would unreasonably restrict mineral material disposal or related uses in the plan area.

## **Lands and Realty**

Analysis of the environmental consequences of the alternatives on lands considered the following key resources or resource uses: transportation management and agricultural lands.

Indicators used to compare environmental consequences between alternatives include: acres without public access, acres available for disposal under the Federal Land Transaction Facilitation Act of 2000, expected rights-of-way application, lands available for agricultural entry, management flexibility, and acres avoided or excluded for rights-of-way applications.

### **Lands and Realty Indicators**

- **Acres of the National System of Public Lands with legal public access.** As lands are acquired or exchanged, access to public lands may change. As public access increases, conflicts related to trespass across private property may decrease.
- **Acres available for disposal under the Federal Land Transaction Facilitation Act of 2000.** A portion of the revenue from the sale of these lands may be used to purchase land from willing sellers in the plan area that meets the acquisition criteria.
- **Expected rights-of-way applications.** Restrictions on or the enabling of public travel on BLM routes increase or decrease, respectively, the number of applications for rights-of-way required by adjacent landowners.
- **Acres available for agricultural entry.** Prescriptions on the management of agricultural lands alter the number of acres available for agricultural entry.
- **Acres avoided or excluded from rights-of-way applications.** The configuration of lands available, avoided, or excluded from potential rights-of-way projects varies by alternative. As restrictions increase, management flexibility decreases and may shift projects onto neighboring lands or regions.

- **Acres zoned as Z-1.** This designation does not allow for use of such lands to be exchanged for private lands that would be even more highly valued. As a consequence, this classification reduces the flexibility of the BLM in meeting its management objectives.

## Lands and Realty Assumptions

- The classification decisions in the RMP are not implementation level decisions, but depend on site-specific NEPA analysis and attainment of other RMP objectives prior to trade or disposal. As such, effects of land tenure zoning on various resources and resource uses are not analyzed at the plan level. During implementation, special values may be found on lands initially classified for potential disposal (Z-3) or trade (Z-2). Therefore, these lands may never leave public ownership.
- Lands zoned Z-1 will remain under BLM administration.
- Over the last decade, most of the plan area acquisitions and trades have been legislated. For analysis purposes, it is assumed that future acquisitions and trades will match the public sentiment that generated the proposed land acquisition criteria.
- The most common method of accessing public lands requires travel on a public road and then onto public lands on foot, horse, or ground-based vehicle. While access by plane or helicopter may be available to a small portion of those using the plan area, most of the public access is overland travel.
- Private landowners currently using isolated parcels will apply for rights-of-way if the roads on those parcels are closed to public access.

## Analysis of the Effects of the Alternatives on Lands and Realty

The analyses described herein are focused on actions of potential measurable environmental consequence.

The following resource uses under all alternatives would have no difference in effects on Lands and Realty across alternatives: Soils, Air Quality, Vegetation Management, Special Status Plants, Fire and Fuels, Aquatic Resources, Wildlife, Wild Horses, Native American Uses, Paleontological Resources, Livestock Grazing, Recreation Opportunities, and Hazardous Materials Management.

### Lands and Realty Management Effects on Lands and Realty

While the majority of BLM lands in the plan area have legal public access, almost 20% do not. While wording of the alternatives varies slightly, they have similar intents. As a result, the effects on legal public access are likely to be very similar between the alternatives. Most acquisition criteria are represented on Map 16. Within this acquisition zone, several parcels currently lack public access. Acquisition of parcels connected to public lands with access would increase the plan area lands with public access by 7% or more. This, in combination with using right-of-way requests to acquire access to public lands (under the action alternatives), exchanging lands, and other actions, would increase the percentage of public lands with public access by 10% over the life of the plan (Objective LR4).

The lands zoned for potential disposal (Z-3) vary by alternative. As a result, lands available for sale and potential reinvestment in the plan area under legislation similar to FLTFA (here in referred to as FLTFA) vary by alternative. Under Alternative 1, there would be 36,956 acres of lands available for FLTFA. The action alternatives would have 18,429 acres available. Therefore, Alternative 1 is more likely to return profits from FLTFA to the plan area to purchase lands for BLM land management objectives.

Recent and historic requests for major transmission lines have followed existing utility corridors. The scattered BLM/private ownership pattern across the plan area encourages the use of existing corridors and rights-of-way over the massive coordination effort that would be necessary with private landowners to connect through a new route. As a result, maintaining the existing utility corridors under all alternatives is likely to provide the least conflict across the landscape for rights-of-way associated with utility and transportation corridors and is not expected to reduce the ability to sell, exchange, or acquire lands to meet management objectives.

Under Alternative 1, almost 40% of the plan area is closed (including NSO, see Minerals and Energy Section) to new rights-of-way. The action alternatives propose a 10% increase in right-of-way closure. However, effects are expected to be minimal because existing rights-of-way may be maintained under all alternatives (including 32 under Alternative 1, and 37 in the action alternatives). The BLM land ownership patterns include both scattered parcels and large blocks. The need for new rights-of-way is minimal in consolidated tracts of public land, and most scattered parcels are either zoned as Z-3 (disposal) or available for rights-of-way.

### **Transportation Management Effects on Lands and Realty**

Under Alternative 1, approximately 250 routes are landlocked. While they are not closed, few rights-of-way exist for access across these parcels. As a result, very few rights-of-way applications would be anticipated under Alternative 1. Under Alternative 3, effects would be similar to Alternative 1, except that the seasonal restrictions on public use of roads may instigate a few right-of-way applications. Under Alternatives 2, 4, and 5, the interim and final transportation system closes 409 routes. Of those, approximately 10% may require rights-of-way for the routes leading to private land or routes surrounded by private land with no legal public access.

### **Agricultural Land Management Effects on Lands and Realty**

The allocation of uses on agricultural type lands alters the number of leases and agricultural entries under Section 7 of the Taylor Grazing Act of 1934, as amended. Under Alternative 1, approximately 492 acres would be available for agricultural use. Under the action alternatives, up to 400 acres may be authorized for agricultural use. However, the actual agricultural entries are expected to follow market trends and remain low over the life of the plan. Other agreements, leases, or public purposes acts on agricultural lands would be addressed at implementation level planning.

## **Communities and Economies**

### **Introduction**

Analysis of the environmental consequences of the alternatives on the local economy and communities living within the John Day Basin considered the following key resources or resource uses: Vegetation (forest products), Fire and Fuels, Special Designations, Livestock Grazing, Recreation Opportunities (use and permits), Access and Travel Management, Energy and Mineral Resources, Lands and Realty, and Agricultural Land Management. The analysis also assessed relative effects of the alternatives on BLM expenditures and employment, disabled users, environmental justice, payments to counties, amenities, migration, and non-market values.

Indicators used to compare environmental consequences between alternatives include: employment and labor income created/lost from BLM management actions, changes to community well-being, and concerns expressed by the communities living and interested in the John Day Basin.

### **Social and Economic Assumptions**

- The plan area population will continue to increase and age as described in Chapter 3.
- The social groups are defined to facilitate the discussion of social impacts. These discussions simplify what are often quite complex and unique values and attitudes and the groupings presented here are by no means mutually exclusive. For example, many ranchers also participate in recreation activities. It is also worth noting that attitudes, interests, and values often change over time. The social analysis will cover the groups and individuals that are most likely to be affected by this plan.
- Regional economic impacts are estimated based on the assumption of full implementation of each alternative. Actual changes in the economy would depend on individuals taking advantage of the resource-related opportunities supported by each alternative. If market conditions or trends in resource use were not conducive to developing some opportunities, the impact on the economy would be different than estimated herein.

- Resource specialists projected annual resource outputs based on the best available information and professional judgment. The purpose of the economic analysis is to compare the relative impacts of the alternatives and should not be viewed as absolute economic values.
- 99.5 percent of timber harvested within the analysis area is logged by logging contractors, while 0.5 percent is logged by local residents.
- Timber harvested within the analysis area would be distributed among the following sectors: sawmills and planing mills (98 percent) and prefabricated wood buildings (less than 1 percent).
- The ratios of harvest to jobs and income used to assess the impacts of the alternatives are based on statewide ratios developed for Oregon by the University of Montana (Keegan *et al.* 2003).
- Over the long term, timber prices are residual values determined by national and international markets based on what the final product market will pay for timber, rather than supply competition at the local level (Lippke *et al.* 2006, pg iii). In addition the share of timber contributed to total harvest in the area is relatively too small to have price impacts in the short term.
- Projected recreation visits are distributed among different types of visitors based on the results of National Visitor Use Monitoring surveys conducted for the Malheur, Ochoco, and Umatilla National Forests.
- The ratios of recreation visits to jobs and income used to assess the impacts of the alternatives are based on national ratios developed through the Forest Service's National Visitor Use Monitoring program.
- Baseline recreation demand is assumed to increase by 3.5 percent per year.
- AUMs under the Reserve Forage Allotment classification are assumed to be utilized 33 percent of the time as regular AUMs (personal communication with Prineville District Office Range staff).
- Range revenues received by BLM and the value of BLM AUMs to operators were calculated using the conservative AUM price for 2008 of \$1.35 per BLM AUM and \$10 per AUM leased in the competitive market.

## **Analysis of the Effects of the Alternatives on Communities and Economies**

This section presents an analysis of social and economic impacts for the management alternatives proposed in the John Day Basin PRMP/FEIS. It discusses economic then social effects common to all alternatives, economic and social effects common to the action alternatives, and then economic and social effects of each alternative.

This section will discuss employment, labor income, and effects on sectors in the eight-county area economy that encompasses the John Day Basin. Impacts to tax revenues, environmental justice, and social communities within the basin will also be presented. Finally, forecasts for the area will be discussed in light of the changes predicted over the 10-year period of analysis.

The economic analysis focuses on changes in labor income and employment associated with BLM planning actions and estimated outputs for the alternatives (Table 4-31). The social analysis focuses on changes to social and economic well-being. Higher employment, subject to some qualifications, can be seen as a benefit to the local community. Other benefits are also present, although some are not easily measured or tied to economic activity. An example of where effects are difficult to quantify are equity effects or impacts to social values. Regardless, these benefits are discussed despite our inability to quantify them.

### **Economic Effects on Economies**

At the John Day Basin planning scale, none of the alternatives would be expected to reduce economic diversity (the number of economic sectors) or increase economic dependency, which occurs when the local economy is dominated by a limited number of industries. While the alternatives have the potential to affect local businesses and individuals, the relative contribution of BLM-related activities to the local economy and the relative differences between the alternatives would not be large enough to have any measurable effect on economic diversity or dependency, though shifts in emphasis could occur. Costs to local governments would also remain unchanged as a result of planning actions (i.e., demand for services and infrastructure would not change as a result of BLM planning actions). The dependency of the local economy on livestock industry, forest products, mining, and recreation activities would not be affected by BLM resource management.

**Table 4-31. Estimated Outputs by Alternative<sup>1</sup>.**

Output	Current <sup>2</sup>	No Action	Alternatives 2-5
Cattle (animal unit months) <sup>3</sup>	16,500	26,312	see Table 4-34
Sheep (animal unit months)	770	836	
Agricultural Lands (acres)	250	400	180
Estimated Forest Product Output (hundred cubic feet) <sup>4</sup>	1,708	6,642	4,820
Bentonite (short tons)	NA <sup>5</sup>	134	134
Construction Sand and Gravel (short tons)	4,660	4,660	4,660
General Recreation (visits) <sup>6</sup>	108,557	131,810	131,810
Fish and Wildlife Recreation (visits)	35,545	43,160	43,160
Crushed Stone (short tons)	1,550	1,550	1,550

<sup>1</sup>All resource outputs, except recreation, are expected to remain constant over the 10-year analysis period. These figures are approximate and intended solely for the purpose of economic and social analysis.

<sup>2</sup>Estimates include actual use levels (average).

<sup>3</sup>Data are based on head months available for activation. The share of actual use from what is available has decreased from 78 percent in 1999 to 48 percent in 2007 (see Table 3-19). 1 head month of cattle and horses = approximately 0.77 AUMs for cattle and horses; 1 head month for sheep and goats = approximately 3.4 AUMs for sheep and goats.

<sup>4</sup>Sawtimber data are based on the Probable Sale Quantity. The current annual average harvest is approximately 26 percent of the current Allowable Sale Quantity.

<sup>5</sup>Bentonite is not currently removed from the plan area.

<sup>6</sup>Recreation visits are expected to increase by 3.5 percent each year.

This is also the case with respect to economic and social well-being, which can be assessed in terms of changes in income, employment and the season of employment, and population.

Estimates of the levels of employment and labor income that would be supported by the alternatives are based on projected resource outputs from BLM management actions (Table 4-32). Estimated average annual employment and labor income are summarized by resource area in Table 4-32 and Table 4-33, respectively. The projected outputs and estimated employment and labor income are discussed by resource in the following sections. Across all BLM resources, impacts from program-related activities under the action alternatives could support higher levels of employment and labor income than currently experienced. Recreation provides the largest program-related contributions to area jobs and labor income under all the alternatives (Tables 4-32 and 4-33). The largest

**Table 4-32. Average Annual Employment<sup>1</sup> by Program by Alternative (Full and Part-time Jobs).**

Resource	Current	Alternative 1 No Action	Alternative 2 Preferred	Alternatives 3-5
Recreation <sup>2</sup>	55	66	66	66
Wildlife and Fish Recreation <sup>2</sup>	19	24	24	24
Forest Products	14	56	40	40
Grazing	6	10	2	See Table 4-35
Minerals	0.3	0.3	0.3	0.3
Payments to Counties	0.4	0.8	0.4	0.5
Total BLM management	95	157	133	135
Percent change from current		64%	40%	42%

<sup>1</sup>Average annual values are based on projected impacts over the 10-year analysis period. Source: Potential employment and labor income impacts are based on the estimated resource outputs summarized by alternative in Table 2-23. Potential impacts were estimated using the IMPLAN model and FEAST.

<sup>2</sup>As discussed in Chapter 3, these recreation estimates do not include visits from local use since their expenditures do not represent new money into the economy.

**Table 4-33. Average Annual Labor Income by Program by Alternative (thousands of dollars).**

Resource	Current	Alternative 1 No Action	Alternative 2 Preferred	Alternatives 3-5
Recreation	\$1,372.82	\$1,666.88	\$1,666.88	\$1,666.88
Wildlife and Fish Recreation	\$486.90	\$591.20	\$591.20	\$591.20
Forest Products	\$432.60	\$1,682.32	\$1,220.88	\$1,220.88
Grazing	\$103.22	\$162.87	\$32.54	See Table 4-36
Minerals	\$13.52	\$15.98	\$15.98	\$15.98
Payments to Counties	\$12.16	\$28.02	\$12.96	\$15.97
Total BLM management	\$2,421.21	\$4,147.28	\$3,540.44	\$3,578.97
Percent change from current		71%	46%	48%

employment and labor income effects would occur in the accommodations and food services, agriculture, and retail trade industry sectors (IMPLAN 2006). Impacts associated with forest products and grazing are speculative considering differences in actual and authorized use levels. The PSQ estimates under the action alternatives would accommodate levels of forest product contributions seen in the past. However, utilization of the grazing matrix (Alternatives 3, 4, and 5) and Lease Relinquishment Decision Tree (Alternative 2) could decrease levels of authorized AUMs through voluntary relinquishment.

While BLM-related jobs and labor income impacts would likely continue to be less than one percent of totals within planning area counties, employment and labor income could be more important for smaller communities within planning area counties. Under all the alternatives, the largest employment and labor income effects would occur in the accommodations and food services, agriculture, and retail trade industry sectors (IMPLAN 2006).

## Recreation Use and Recreation Permits Effects on Economies

### **Effects Common to All Alternatives**

While providing recreation opportunities to local residents is an important contribution, the recreation expenditures of locals do not represent new money introduced into the economy. If BLM-related opportunities were not present, residents would likely participate in other locally based activities and their money would still be spent in the local economy. After separating the contributions made from local residents, recreation contributes the most employment and labor income to the area economy of all resource programs under all alternatives (Tables 4-32 and 4-33).

The role of recreation in the local economy would continue as OHV use, non-motorized use, boating and other forms of recreation continue to increase. Travel to the basin from throughout the state to enjoy these opportunities is not an unreasonable assumption. Population projections for counties in and around the plan area suggest an annual average increase of 3.5 percent is reasonable and conservative (State of Oregon DAS 2007).

An annual average of approximately 132,000 general recreation visits and 43,000 fish and wildlife-related recreation visits are projected under all the alternatives (Table 4-31). This increase over the current level of visitation would be due to the baseline increase in recreation visits (3.5 percent per year) that is projected under all of the alternatives. It is assumed that revenues received by BLM from campground and commercial recreation fees would increase at a similar rate and would average about \$16,000 annually.

While there are no differences anticipated as a result of the alternatives, recreation actions would sustain use levels important to the area economy and well-being. Under all alternatives, area recreation on BLM-administered lands would sustain approximately 66 jobs and \$1.7 million in labor income annually in the eight-county planning area from non-local contributions (Tables 4-32 and 4-33) (IMPLAN 2006). While this does not consider economic contributions made from local recreationists, the economic impacts from the recreation program are estimated to be the largest among programs managed within the John Day Basin.

Jobs and income associated with recreation management should not overshadow the economic value of experience by recreation users within the basin. Boating use in the lower river basin could change as management actions associated with existing management are implemented. For example, BLM management of the recently designated Spring Basin Wilderness could increase boating use along the John Day. Additionally, if Congress designates the North Fork John Day as a Wild and Scenic River, increased use may result. Conservative benefit estimates for river use in Oregon and California (Douglas *et al.* 1998) value a per-person per-day river trip at \$34.67 in 2006 dollars. Given river visitation numbers for 2006 (boater visits from Prineville District office staff), the value of float boating, canoeing, and rafting totaled \$669,200. This number would at least be maintained with recreation management proposed in the alternatives, and could increase with increased use levels. Similar estimates for OHV and other motorized or non-motorized recreation are not available given the lack of data regarding visitor use levels for these activities.

### **Effects of Alternative 1**

It is estimated that recreation, including fish and wildlife-related recreation activities, currently accounts for approximately 57 percent of all the jobs and 54 percent of labor income that could be supported by Prineville District Office activities (Table 4-32 and Table 4-33). Motorized access and motorized recreation opportunities would not change from the current condition.

### **Effects Common to All Action Alternatives**

Outfitters and guides would have more opportunity under the action alternatives than currently since BLM would issue new upland-based special recreation permits as deemed appropriate by this RMP.

## **Forest Products Effects on Economies**

### **Effects Common to All Alternatives**

The No Action and action alternatives would continue to supply wood product materials as shown in the estimated forest products output estimates in Table 4-31. Under the No Action Alternative, the current Allowable Sale Quantity (ASQ) would potentially be available, while under the action alternatives the Probable Sale Quantity (PSQ) would potentially be available. To the extent practical, the proposed resource management plan would allow for the entry of new business that might offer value added products (such as log homes or furniture) or biomass energy. These nontraditional materials have sometimes been considered low value forest materials; however, industries could develop in the region that would utilize these products more efficiently.

While harvests under the No Action Alternative and action alternatives would not have a large effect (considering the total amount of material available from all ownerships in the area (Figure 3-34), they are still important. Considering decreases in federal harvests throughout the region (Figure 3-34), the BLM has recently provided a greater share of forest products than it has in the previous 40 years. Despite relative decreases in actual levels of harvest from BLM lands, the BLM may provide an increasing share of the total harvest if the PSQ estimates are harvested.

The vegetative treatments proposed under all alternatives would tend to reduce the occurrence and intensity of wildfire events. These treatments are expected to reduce the severe levels of tree mortality and site damage experienced during large scale, stand-replacement events; they would also reduce the amount of salvage volume available from such events in the future. The treatments, which intend to reduce the severity of wildfire events, would also supply future forest products, thereby helping to sustain economic conditions.

The existing management and proposed alternatives would sustain current local government revenues from forest product sales within the area, as 4 percent of non-stewardship timber receipts are paid to the counties where they are generated. If PSQ estimates were achieved (beyond the 26 percent of existing ASQ harvested), revenues received by counties would increase.

### **Effects of Alternative 1**

Alternative 1 would allow an average annual harvest of approximately 6,642 hundred cubic feet (CCF) of forest products (Table 4-31). The majority of this estimate (6,638 CCF) is based on the sawtimber ASQ and reflects the annual volume that would be available rather than actual harvest projections. Annual average harvest is approximately 26 percent of the current ASQ. The remainder of the harvest estimate consists of fuelwood and post

and poles (4 CCF). If harvests were to occur at ASQ levels, approximately 56 jobs and \$1.7 million in labor income (Table 4-32 and Table 4-33) would be supported within the local or regional economy. In addition to direct job and income impacts in the forest products industry, these estimates include impacts to industries that provide factors of production to the forest products industry, and other industries impacted by wage-related spending.

Alternative 1 would maintain current levels of BLM forest product offerings and current levels of associated employment and labor income (21 jobs and \$465,000 in labor income). If ASQ estimates were achieved, employment and labor income could increase to levels noted above, and economic well-being would potentially improve.

**Effects Common to All Action Alternatives**

The action alternatives would provide for an average annual harvest of approximately 4,820 CCF of forest products (Table 4-31). The majority of this estimate (4,817 CCF) is based on the sawtimber PSQ and reflects the annual volume that would be available, rather than actual harvest projections, if the Prineville Office committed to treating 1,000 acres per year by commercial and pre-commercial thinning. The remainder of the harvest estimate would consist of fuelwood and post and poles (3.21 CCF). This harvest, if it were to occur, would support approximately 40 jobs and \$1.2 million in labor income (Table 4-32 and Table 4-33). The action alternatives offer less forest products and thus have smaller consequent impacts than the No Action Alternative. However, it must be noted that only 26 percent of ASQ has been harvested historically. The action alternatives could thus maintain or increase the jobs and labor income supported through forest product management since potential CCF under the offered PSQ is greater than recent harvests from BLM.

**Livestock Grazing and Ranching Effects on Economies**

**Effects Common to All Alternatives**

The relatively low level of economic dependency on BLM forage would continue under all the alternatives. The BLM’s permitted use levels would provide a maximum of approximately 6.5 percent and a minimum of 1.2 percent of total forage needed to feed livestock in Gillam, Grant, and Wheeler counties in 2007. Jobs and labor income associated with grazing would continue to account for less than one percent of area totals (in both the smaller Gilliam, Grant, and Wheeler area and the larger eight-county areas). However, these jobs and the forage provided by BLM could be more important for smaller communities within planning area counties.

Although overall economic dependency would remain low, it is reasonable to assume that BLM forage would continue to provide a low cost and important complement to some livestock producers’ grazing, forage, and hay production. While the value to area operators is not evident in the projected job and employment impacts, they should be considered. The value to these operators from BLM grazing can be estimated as the difference between the competitive market price of an AUM and the BLM lease fee. This value is experienced above the price ranchers pay for AUM leases and can be considered a benefit. The benefit to operators from BLM grazing varies amongst the alternatives, however would not fall below \$48,500.

**Effects of Alternative 1**

Alternative 1 could authorize average annual grazing of approximately 26,312 cattle AUMs and 836 sheep AUMs (Table 4-34) and support as much as 10 jobs and \$162,870 in labor income (Table 4-32 and Table 4-33). Annual revenues received by the BLM from grazing leases would amount to approximately \$36,600.

**Table 4-34. Current Use and Permitted Animal Unit Months per Alternative.**

Resource	Current	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Cattle	16,493	26,312	4,742	10,618	10,047	10,472
Sheep (Horn Butte)	770	836	836	836	836	836

The benefit of BLM AUMs to operators associated with 27,148 BLM AUMs would continue to be approximately \$234,800. So while estimated impacts are relatively small in comparison to area employment and labor income, the value of BLM AUMs to area ranchers would be maintained.

### **Effects Common to All Action Alternatives**

A determination of changes to livestock grazing provided by BLM is speculative given high degrees of variation that could result with implementing the grazing matrix under Alternatives 1, 3, 4, and 5 and implementing the Lease Relinquishment Decision Tree under Alternative 2 (see Livestock Grazing, Chapter 2 for a description of the Grazing Matrix and the Lease Relinquishment Decision Tree). Under all alternatives, the authorized level of use would decrease; however, the AUM estimates assume voluntary relinquishment of 100 percent of the applicable grazing leases.

As stated above, this decrease is speculative since it depends on voluntary relinquishment of permits. The economic contribution from BLM would decrease; however, changes in equity from this decrease cannot be inferred. Since ranchers act in their own best interests and seek to improve their well-being, voluntary relinquishment would at least maintain or improve their well-being.

Given the possibility of voluntary relinquishment of permits with use of the grazing matrix and Lease Relinquishment Decision Tree, average annual employment and labor income supported by all grazing alternatives could drop slightly (Tables 4-35 and 4-36).

Under the action alternatives, with the possibility of full relinquishment of grazing leases, payments to counties would correspondingly decrease to levels below those currently experienced. Regardless, these payments would provide for a small amount of area employment and income.

The benefit of BLM AUMs to area ranchers could potentially decrease from Alternative 1 to the action alternatives with full relinquishment of permits. It must be noted however that efficiency gains and economic well-being could remain the same or increase as conflicts are resolved with implementation of the grazing matrix and voluntary relinquishment of grazing leases under the Lease Relinquishment Decision Tree (Tables 2-19 and 2-20). These actions may enhance non-market values, offsetting losses in the benefit of BLM AUMs to area ranchers. For example, in-stream flow and water quality could increase existence values as populations of Mid-Columbia river steelhead improve.

### **Effects of Alternative 2**

A determination of changes to livestock grazing provided by BLM is speculative given high degrees of variation that could result with implementation of the Lease Relinquishment Decision Tree (see Livestock Grazing section of Chapter 2 for a description of the Lease Relinquishment Decision Tree).

**Table 4-35. Average Annual Employment Associated with Grazing by Alternative (Full and Part-time Jobs).**

Resource	Current	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Grazing	6	10	2	4	4	4
Payments to Counties	0.3	0.4	0.1	0.2	0.2	0.2

**Table 4-36. Average Annual Labor Income Associated with Grazing by Alternative (Thousands of 2008 Dollars).**

Resource	Current	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Grazing	\$103.22	\$162.87	\$32.54	\$68.05	\$64.60	\$67.16
Payments to Counties	\$8.87	\$13.95	\$2.87	\$5.88	\$5.59	\$5.81

Alternative 2 could authorize approximately 4,792 cattle AUMs and 836 sheep AUMs (Table 4-34), which could support two jobs and approximately \$32,540 in labor income (Table 4-35 and Table 4-36). These job and employment impacts would represent a decrease compared to the current contribution from grazing; however, this AUM estimate assumes 100 percent of applicable grazing leases are relinquished. Regardless, the BLM grazing-related jobs would continue to remain a relatively small portion of overall employment and labor income for the area.

Annual revenue received by BLM from grazing under Alternative 2 would be approximately \$7,530. The benefit of BLM AUMs to area ranchers would be approximately \$48,250 with full voluntary relinquishment of permits. So, while estimated employment and income impacts are small, the value of these AUMs to local ranchers is important. The AUM benefit would be less than Alternative 1; however, economic well-being could remain the same or increase as conflicts are resolved with voluntary relinquishment of grazing leases. Non-market values may be enhanced with the Lease Relinquishment Decision Tree since campsites and Mid-Columbia steelhead and Washington ground squirrel habitat would be considered during reauthorization of relinquished permits. For example, in-stream flow and water quality could increase existence values as populations of Mid-Columbia river steelhead improve. The resulting increases in non-market values could offset losses in the benefit of BLM AUMs to area ranchers.

### **Effects Common to Alternatives 3, 4, and 5**

Alternatives 3, 4, and 5 could authorize a maximum AUM contribution higher than Alternative 2 (Table 4-34) and could support slightly greater amounts of area employment and labor income. However, BLM grazing-related contributions would continue to remain a relatively small portion of overall employment and labor income for the area; about 4 jobs and \$64,600 to \$68,000 in labor income would be supported annually (Table 4-35 and Table 4-36). The range of annual revenue received by BLM from grazing and the benefit of AUMs to area ranchers (\$14,700 to \$15,400 and \$64,100 to \$99,000, respectively) would also be higher than Alternative 2.

## **Mineral Resources Effects on Economies**

### **Effects Common to all Alternatives**

Salable minerals, such as sand and gravel, would continue to be provided by the BLM in the plan area. While bentonite is not currently mined, proposals have been submitted and commercial activities are likely to occur in the future. While these mining activities are not a direct result of new planning actions in this resource management plan, management under this RMP would allow and determine the nature of these activities. Less than one job and \$18,800 in labor income would be supported by this mineral activity (Tables 4-32 and 4-33). Since the sand and gravel operations utilized by the county and state governments operate under free use permits, no revenues are received by the BLM and consequently no payments to counties are made. However, the counties receive value from this mineral material and a portion of employment income is provided to communities (Table 4-32 and Table 4-33). Similarly, the bentonite mine would operate according to the 1872 Mining Law, under which claims pay no lease fees; however, they would pay federal taxes on revenues received.

While a small amount of gold is removed from recreational mining activity, other locatable and leasable minerals are not removed from BLM lands in the planning area. Under all the alternatives, all public lands would be open to recreational mineral collection unless there are prior rights in an area, such as mining claims.

## **Payments to Counties Effects on Economies**

### **Effects of Alternative 1**

All of the AUMs leased by the BLM within the John Day Basin are section 15 permits, from which 50 percent of revenues are distributed to the state and then local counties. Estimated grazing revenue distributions to local counties would be about \$18,000. County payments from forest products sales under this alternative would total \$18,495. Average annual employment associated with these payments to counties would support close to 1 job and \$28,020 in labor income. These estimated payments depend upon actual use levels being equal to ASQ and AUMs authorized. If actual harvests and AUMs utilized follow existing trends, the impacts to employment and labor income would be less than predicted here. On an average annual basis, payments to counties from forest product receipts and grazing leases currently support less than 0.5 job and \$12,160 in labor income (Tables 4-32 and 4-33). Average annual contributions to counties under this alternative would likely remain close to current levels.

### **Effects of Alternative 2**

Annual payments to counties from grazing leases would be about \$3,800. Associated employment would remain at less than 1 job and labor income impacts would amount to \$2,870 (Tables 4-35 and 4-36). Payments to counties from forest products could total \$13,260 with associated impacts of less than one job and \$10,090 in labor income (Tables 4-32 and 4-33). Payments to counties from both range and forest product revenue distributions would remain similar to the No Action Alternative; however, with full relinquishment of grazing leases, the distributions could decrease from current levels.

### **Effects of Alternatives 3, 4, and 5**

Annual payments to counties from grazing leases would be similar for Alternatives 3, 4, and 5, ranging from \$7,730 to \$7,340. Associated employment and labor income impacts from these payments would be similar as well (Tables 4-35 and 4-36). Combined with payments to counties from forest product harvests, the employment and labor income impacts would be slightly more than Alternative 2 (Tables 4-32 and 4-33).

## **BLM Expenditures and Employment Effects on Economies**

### **Effects Common to All Alternatives**

The levels of expenditures and employment at the Prineville BLM Office and within the John Day Basin are not expected to vary by alternative. While this is not a planning level decision, it is an important contribution to the local area economy and well-being. The BLM's expenditures and employment in the basin are expected to follow recent trends as outlined in Chapter 3 (Table 3-17) and may slightly decrease (personal communication with Prineville District Office Budget staff). Because expenditures from BLM actions that occur solely within the basin could not be separated from the overall Prineville District Office expenditures, they were not included in the impact analysis.

## **Land Tenure Effects on Economies**

### **Effects of Alternative 2**

This RMP revision proposes increasing the number of acres zoned Z-3 (available for disposal) from 40,444 to 68,192 acres. While zoning this land as Z-3 makes disposal possible, it is far from guaranteed. Further NEPA processes not covered under this plan would evaluate the availability of this land for disposal if proposed. If this land is disposed, it would no longer count towards the entitlement acreage used in PILT calculations which would decrease the contribution from BLM land in the area. However, if BLM land is disposed, it would be subject to property taxes whereas before disposal it was not. Payments under PILT are designed to help offset losses in property taxes due to the nontaxable status of Federal lands within state or county boundaries. Therefore, in theory, county property taxes should increase and offset losses from the qualifying entitlement acreage for PILT.

If BLM land ownership does shift, approximately 18,000 acres of this Z-3 land are most likely to be disposed. These lands qualify under the Federal Land Transaction Facilitation Act as lands that BLM can sell and use the money to buy more land on the district. This would comprise approximately 4 percent of 2007 BLM entitlement acreage in the eight-county study area. Any one county could lose these lands and the associated payments while the other counties would theoretically then see increases in payments with gains in entitlement acreage. Impacts associated with these payments to any 1 county would be less than 1 job and \$4,700 in labor income. Despite these possible changes, total PILT payments from the federal government to the eight counties within the study area would likely continue to remain around recent levels.

## **Fire and Fuels Effects on Economies**

### **Effects Common to All Alternatives**

Projected fuel treatment costs vary from approximately \$437,000 to approximately \$635,000 annually under all alternatives. Potential wildland fire-related costs (such as property loss, lost revenues, and suppression costs) cannot be projected. It is commonly accepted that fire suppression costs and risk to life and property should be less when wildland fires occur where hazardous fuels have been treated compared to areas where fuels have not been treated. For example, fires generally burn hotter, flame length is higher, and fires in tree canopies are more likely in non-treated areas.

It is anticipated that fuels treatments on public lands within the plan area would contribute to fuels conditions that would have less resistance to wildland fire control. This would tend to reduce the threat to life and property. It is not, however, possible to project the level of non-prescribed wildland fire that would occur under any of the alternatives. Based on the level of hazardous fuels treatments under the proposed alternatives, one might conclude that fire suppression costs would be greater than in the past since fewer acres would be treated than currently (see Table 4-31). However, the use of appropriate response (including fire to achieve resource objectives) on approximately 1,500 acres would essentially act as treatment in areas already prone to fire, further reducing future wildland fire-related costs.

## **Renewable Energy Effects on Communities and Economies**

### ***Effects Common to All Alternatives***

While all land in the plan area without surface occupancy restrictions would potentially be available for wind energy development (given further site-specific review), not all land can be considered suitable for development. Developable land for wind energy depends on the wind resource and transmission line availability and capacity. Decisions to invest in wind energy are also dependent on the cost of alternative sources of energy, as well as the regulatory environment and other costs to society. Natural gas, oil and coal prices therefore also determine the level of wind energy investment. The commercial viability of wind power also depends on the pricing regime for power producers. All of these components are difficult to predict and make speculation on possible development impractical.

However, some speculation can be made based on professional judgment. Within approximately 20 miles of the Mid Columbia River Corridor, private land available for wind energy development is saturated with wind turbines. Within this corridor, development interest may exist on BLM lands. Further south, specific areas with high wind potential may be of interest (personal communication with Paul Woodin). The BLM-administered lands with high wind potential may not be plentiful in the plan area and would thus limit development. Additional costs associated with development on public land (i.e., site-specific planning) may inhibit development as well. However, given further saturation of available private land and/or changes in energy markets and technology, development on BLM-administered lands in the plan area may become more likely.

## **Role of Amenities, Migration, and Non-market Values on Economies**

### ***Effects Common to All Action Alternatives***

The economic analysis assesses the economic effects of the direct use of resources in terms of jobs and income. This type of analysis does not include other types of economic value often referred to as non-market values. Non-market values are held by visitors, area residents, and others outside the basin and are an important part of their well-being. They include natural amenities, quality of life factors, recreational opportunities, ecosystem services, and non-use values such as existence, option, and bequest values.

Non-market values associated with recreation opportunities are addressed along with economic effects from recreation when data is available. Other non-market values are difficult to quantify or insufficient data exists to assess the effects of management actions. However, the fact that no monetary value is assigned to these values does not lessen their importance in the decision-making process.

Regardless, we can make some helpful inferences. While there is a general consensus that non-use values exist, the methodologies for measuring these values are controversial and difficult to apply. Wilderness has been the subject of numerous non-use studies, usually conducted for specific natural areas; however, no attempt has been made to directly elicit potential non-use values associated with the alternatives under this RMP. None of the alternatives propose new wilderness, but the action alternatives would establish areas to be managed for wilderness characteristics; propose several new ACECs; and recommend segments of the North Fork John Day River for congressional designation to the National Wild and Scenic River System). A total of at least 19,442 acres under Alternatives 2, 3, and 5, and 35,457 acres under Alternative 4, are proposed to be managed by the BLM for protection of wilderness characteristics; there would also be 68,404 acres of ACEC/RNAs that would be proposed. Under the No Action Alternative, management for wilderness character is limited to previously identified Wilderness Study Areas. The proposed action would also increase the amount of ACECs by more than ten times what is currently designated. These designations would further maintain and perhaps enhance non-market values associated with natural amenities protected on these lands.

In addition to ACECs, lands to be managed for wilderness characteristics and recommended as Wild and Scenic Rivers may attract new residents to the area, which would then contribute to area economic activity. Natural amenities and quality of life have been increasingly recognized as important factors in the economic prospects of many rural communities in the West (Rudzitis and Johnson 2000). In addition, non-labor income is tied to natural amenities as discussed in Chapter 3. Rural county population change, the development of rural recreation, and retirement-destination areas are all related to natural amenities (McGranahan 1999). Thus, the established ACECs and land to be managed for wilderness characteristics may similarly contribute to the area's economic well-being.

### **Effects of Alternative 3**

As discussed above under Effects Common to Action Alternatives, more land would be managed for wilderness characteristics, more acres as ACECs, and more miles of the North Fork John Day would be recommended for designation as WSR under the action alternatives than Alternative 1. Alternative 3 recommends the same number of miles be designated WSR, except under either a Scenic or Recreation classification, depending on segment. This alternative would ensure protection of non-market values and natural amenities valued by current and new residents to the area to almost the same degree as Alternative 2.

### **Effects of Alternative 4**

Under Alternative 4, no miles of the North Fork John Day River would be recommended as suitable for designation as a Wild and Scenic River. This alternative would have the least protection of WSR-related non-market values and natural amenities that are valued by current and new residents to the area. However, under this alternative, all areas found to have Wilderness Characteristics would be afforded the full range of protections identified for wilderness character values; thus, this alternative would have the most acres designated to maintain wilderness characteristic related non-market and natural amenity values.

## **Social Effects**

The following social analysis assesses the potential effects of management actions common to all the alternatives on identified social groups. These groups were identified based on past studies in and around the plan area, public scoping, and public meetings conducted for the John Day Basin RMP. The analysis addresses the potential impacts of the alternatives based on the issues and concerns raised by these groups during the public involvement effort.

### **Recreation Effects on Social Groups**

#### **Effects Common to All Action Alternatives**

Limiting Class I, II, and III OHV use to designated roads and trails, except within the designated Open areas, would be less favored by individuals and groups interested in OHV use, hunting, and access. However, these changes could be favored by those interested in resource protection and non-motorized uses. General areas subject to these changes include the Bridge Creek SRMA, Lower John Day SRMA, and the ERMA.

Despite these new area designations, some areas (such as the JV Ranch) that have been historically closed would be designated as Limited to designated trails. This change could be preferred by OHV users, hunters, and those interested in access. Technical Class II, Class III, and mountain bike opportunities would be provided under the action alternatives. Horseback riding, camping, boating, wildlife viewing, hunting, recreational mining, rock hounding, antler collecting, and scenic driving opportunities would continue to be provided by the action alternatives.

Outfitters and guides would have more opportunity under all alternatives than they currently do since BLM would issue new upland-based special recreation permits as appropriate. Opportunities along the river could be enhanced given the moratorium on new permits and transfers would be discontinued. Individuals and groups interested in niche market opportunities would likely prefer this over the No Action Alternative. Employment for locals was an interest often expressed during the public involvement process. These new permits were often cited as a means to capture more jobs locally, which could occur under the action alternatives.

Limits to access by hunters, outfitters, and guides might occur with restrictions on cross-country OHV travel and game retrieval. However, game retrieval by other methods such as horseback may become more common with restrictions on OHV use.

This social discussion examines effects to adjacent residents in the Little Canyon Mountain area; effects to general users are discussed in greater detail in the recreation section of this chapter. Under all the action alternatives, except Alternative 5, the effects to residents from OHV sound would occur to some degree as shown in Tables 4-23a, 4-23b, and 4-24. Area residents hold different perceptions of this use and its consequent noise impacts; some residents find the use and noise acceptable if managed properly at acceptable levels while others find any use or noise impact unacceptable.

The recreation section of this chapter discusses factors that affect how sound propagates away from its source and the role that distance plays as a buffer from these sources. Using this information and data on the number of residences that fall within different distances from the North and South Pit Areas of Little Canyon Mountain (Table 4-23b), the BLM expects that OHV sound levels under the action alternatives are unlikely to exceed standards for daytime noise levels at any residence currently adjacent to the North and South Pit Areas of Little Canyon Mountain. In addition, the action alternatives would reduce OHV sound relative to the No Action Alternative. While some degree of OHV-sound impacts would remain under all the action alternatives, these alternatives are expected to reduce conflict between OHV users and adjacent landowners. For example, limiting OHV use to designated routes under all the action alternatives would decrease the amount of area affected by sounds from OHV use. Effects specific to the North and South Pit Areas are discussed below.

### ***Effects of Alternative 1***

Under Alternative 1, existing motorized and non-motorized recreation and access opportunities would continue; thus, the season closure and route designation occurring under the other alternatives would not occur. For example, the seasonal closure in the Lower John Day SRMA would not be imposed and consequently preferred by those interested in hunting, access, and OHV use in that area. The recreation section of this chapter discusses other specific effects of this alternative on recreation users; however, the effects from OHV noise to adjacent landowners of LCM are of particular concern. Since motorized recreation opportunities would be the same as exist currently, impacts from OHV noise to adjacent landowners would remain the same. With no active control of OHV use adjacent to residences, noise from OHVs could possibly exceed the State of Oregon standard of 60 decibels.

### ***Effects of Alternative 2***

Alternative 2 emphasizes a balance of motorized and non-motorized recreation and access opportunities compared to the other action alternatives. Seasonal closure in the Lower John Day SRMA would be preferred less by those interested in OHV, hunting, and access to BLM; however, the 3,971-acre Rudio Mountain OHV area under this alternative and Alternative 3 would be preferred by these individuals and groups. In addition, this alternative would not allow shooting in the Little Canyon Mountain area which would be preferred by area residents. While some individuals accustomed to this unregulated use would not favor this aspect of Alternative 2, they are likely to find other substitute areas for target practice. The recreation section of this chapter discusses other specific effects to recreation users of this alternative; however, the effects from OHV noise to adjacent landowners of Little Canyon Mountain area are of particular concern. Under this alternative, restrictions on allowable decibel levels in the South Pit area and closure of all OHV use in the North Pit area would reduce noise impacts to adjacent residents relative to Alternatives 1 and 3. In addition, the South Pit area would be open to cross-country travel by Class II vehicles only, which typically emit lower frequency sound and may be perceived as less annoying than higher frequency sounds. As described in the recreation section, the closest residence is 937 feet. Table 4-23a indicates the expected noise level at the closest residence to be less than 49 decibels. Since noise levels would not exceed the commonly accepted limit of 55 decibels at adjacent residences, existing conflict would be assuaged with decreased potential for noise impacts relative to the current situation. Regardless, noise effects to adjacent residents would remain greater than Alternatives 4 and 5.

### ***Effects of Alternative 3***

Alternative 3 emphasizes mixed recreation use with a slight emphasis towards motorized uses. Off-highway vehicle users would also likely prefer the 598-acre Golden Triangle OHV Open area in addition to the Rudio Mountain Open area under this alternative compared to the Limited designation under Alternatives 4 and 5. Individuals and groups interested in resource protection and non-motorized use would thus prefer the other action alternatives over Alternative 3. The recreation section of this chapter discusses other specific effects to recreation users of this alternative; however, the effects from OHV noise to adjacent landowners of Little Canyon Mountain area are of particular concern. As described in the recreation section, the closest residence is 937 feet. Table 4-23a indicates the expected noise level at the closest residence to be less than 49 decibels. Since noise levels

would not exceed the commonly accepted limit of 55 decibels at adjacent residences, existing conflict would be assuaged with decreased potential for noise impacts relative to the current situation. Alternative 3 would result in more OHV activity in the North Pit area, which is the closest to the residences. While noise from OHV activity would be within State law at the closest residence, the increased activity relative to Alternatives 2, 4, and 5 would result in noise-related annoyance to residence that oppose OHV noise in this area.

### ***Effects of Alternative 4***

Alternative 4 emphasizes mixed recreation use with a slight emphasis towards non-motorized uses. This alternative would likely be favored by non-motorized users and those interested in resource protection based on seasonal closures and Limited area designations. Off-highway vehicle users would prefer Alternatives 2 and 3 under which open cross-country motorized use on the Rudio Mountain plateau would be allowed. The recreation section of this chapter discusses other specific effects to recreation users of this alternative; however, the effects from OHV noise to adjacent landowners of the Little Canyon Mountain area are of particular concern. The noise effects on these residents under this alternative would be less than Alternatives 1, 2, and 3 but more than Alternative 5 as a result of OHV closure in the North Pit area and a reduction in the season of use in the central portion of the Little Canyon Mountain area. As described in the recreation section, the closest residence to the South Pit area is 1,839 feet. Table 4-23a indicates the expected noise level at the closest residence to be less than 43 decibels. Since noise levels would not exceed the commonly accepted limit of 55 decibels at adjacent residences, existing conflict would be assuaged with decreased potential for noise impacts relative to the current situation. Regardless, noise effects to adjacent residents would remain greater than Alternative 5.

### ***Effects of Alternative 5***

Alternative 5 would likely be the most favored by non-motorized users and those interested in resource protection. These groups would prefer Alternatives 2 and 3 under which the Rudio Mountain plateau would be open for cross-country motorized use. Management in the Little Canyon Mountain area would be least preferred by OHV users; however, non-motorized users and area residents would likely prefer this alternative over the other alternatives. The recreation section of this chapter discusses other specific effects to recreation users of this alternative; however, the effects from OHV noise to adjacent landowners of the Little Canyon Mountain area are of particular concern. The maximum decibel levels depicted in Table 4-23a would not occur with OHV closure in the North Pit, South Pit, and the central portion of Little Canyon Mountain areas. Since OHV noise levels would not occur nor exceed the commonly accepted limit of 55 decibels at adjacent residences, existing conflict related to OHV noise would be resolved.

## **Forest Products Effects on Social Groups**

### ***Effects Common to all Alternatives***

Forest product-related issues raised during public involvement included concerns regarding fuel hazard reduction, impacts to scenery and other resources, dead tree salvage, and area jobs. As noted above, the current annual average harvest is approximately 26 percent of the current ASQ. Thus harvest levels under all alternatives may be infeasible given historic differences in ASQ and actual sales. Some individuals and groups interested in resource protection would be less likely to prefer the current situation as it pertains to hazardous fuel reduction, but prefer the resource protection they associate with less harvest. Individuals and groups interested in resource use would find the continued depressed harvests less favorable since fewer jobs are created. However, some might prefer the fact that more salvage opportunities may be created as fuels continue to go untreated. The potential for unharvested salvage that might also occur under this scenario would further exacerbate the frustration of others interested in resource use.

### ***Effects of Alternative 1***

Harvests from BLM lands account for a very small portion of total harvest in the study area (see Forest Products section in Chapter 3). Available forest products under Alternative 1 support what is currently provided, so current contributions would likely remain unchanged. Public access and the availability of firewood and other forest resources would also remain unchanged. As a result, this alternative would be unlikely to affect current social conditions with respect to forest products.

The action alternatives would provide fewer estimated AUMs of grazing and fewer CCFs of timber harvest, relative to Alternative 1. Individuals interested in resource protection would prefer the No Action Alternative as

it relates to fuel hazard reduction, but would find associated impacts to scenery and other resources disagreeable. Individuals and groups interested in resource use would find the higher levels of jobs and labor income associated with this alternative more favorable than the other alternatives, if the harvest estimates under ASQ were achieved. However, harvest levels under Alternative 2 may be more probable given changes in vegetation management outlined in Chapter 2.

One measure of social well-being often considered is change to the season of employment common in the area. The BLM-related activities in the basin include logging and recreation, which are typically characterized by seasonal employment, but none of the alternatives would be expected to affect existing trends in the season that employment occurs.

### **Effects Common to All Action Alternatives**

Continued access to forest products was a concern stated during public involvement by individuals and groups interested in resource use and niche market opportunities. During formation of the plan, areas surrounding all communities, regardless of size, were considered for special forest product uses; areas within 25 miles of communities greater than 100 in population were considered for these uses, which amounted to the entire plan area.

## **Ranching Effects on Social Groups**

### **Effects of Alternative 1**

Under this alternative, the authorized level of AUMs would continue to provide approximately 1 percent of the total forage needed to feed the livestock within the plan area. While this may seem like an insignificant number, these lands are important to operators because of their relatively low grazing fees, which provide an important complement to other factors of production for area ranchers (see estimate above of the benefit to area ranchers from BLM AUMs). Issues raised by individuals and groups interested in ranching included fire suppression, access and OHV use. Issues related to fire suppression would in large part remain unaddressed under the No Action Alternative. Current levels of access and OHV use would continue under this alternative, enabling ranchers to maintain their operations as currently managed. Conflicts associated with recreation use, such as vandalism and trash dumping, would likely continue under this alternative.

### **Effects Common to All Action Alternatives**

Issues brought up during the public involvement process concerning ranching included access and OHV use. Many of these issues and others more specific to certain allotments have the potential to be addressed with implementation of the grazing matrix and voluntary relinquishment of grazing leases under the Lease Relinquishment Decision Tree. Under Alternatives 3, 4, and 5, the matrix modifies livestock grazing to reduce conflicts between grazing and other uses (Tables 2-19 and 2-20). Human uses, ecological conflict, and AUM demand would be considered in this decision. Thus concerns with access and OHV use could be addressed with the matrix. Under Alternative 2, conflicts with recreation and habitat are reduced with consideration of campsites, Mid-Columbia River steelhead habitat, and Washington ground squirrel habitat. Implementation of these actions would be preferred by those interested in resource protection and recreation. Thus, these individuals and groups would likely prefer solutions presented with the matrix and the Lease Relinquishment Decision Tree rather than the No Action Alternative. In addition, reserve forage allotments would be available, which would often give livestock operators more flexibility.

Even with reauthorization of relinquished permits, the number of AUMs could be reduced since the grazing matrix (Alternatives 3, 4, and 5) would seek to resolve conflict and the Lease Relinquishment Decision Tree (Alternative 2) would consider campsites, Mid-Columbia River steelhead habitat, and Washington ground squirrel habitat. In some cases, however, reauthorization could increase actual AUM use on individual allotments since reauthorization would allow grazing by a qualified lessee on an allotment that may have previously been in non-use.

### **Effects of Alternative 2**

Issues mentioned during the public involvement process concerning ranching included access and OHV use. Many of these issues and others more specific to certain allotments have the potential to be addressed with voluntary relinquishment of grazing leases. Individuals and groups interested in access, as well as ranchers, would likely prefer solutions presented with the Lease Relinquishment Decision Tree. Potential decreases in available AUMs would likely be less preferred by individuals and groups interested in ranching and resource

use; however, non-market values would improve with consideration of campsites, Mid-Columbia River steelhead habitat, and Washington ground squirrel habitat.

Overall, some AUMs would be lost with reauthorization of relinquished permits since campsites, Mid-Columbia River steelhead habitat, and Washington ground squirrel habitat would be considered during reauthorization. Individuals and groups interested in resource protection would prefer this over the other alternatives given the special attention to these resources under this alternative. However, reauthorization on individual allotments could increase actual AUM use on that allotment since reauthorization would allow grazing by a qualified lessee on an allotment previously in non-use. This would be preferred by individuals and groups interested in ranching and resource use while still maintaining values important to those interested in resource protection.

### ***Effects of Alternative 3***

Higher levels of AUMs in Alternative 3 than the other action alternatives suggest those interested in resource use and ranching would prefer this alternative over the other action alternatives. Individuals and groups interested in resource protection would prefer Alternative 3 over Alternative 2 given that some streams are buffered from grazing uses by 0.125 mile. However, those interested in resource use and ranching in the North Fork John Day acquired lands would likely prefer the other action alternatives as these lands are not given special consideration for grazing matrix calculations.

### ***Effects of Alternative 4***

Under Alternative 4, lower levels of AUMs than the other alternatives suggest those interested in resource use and ranching would likely prefer the other alternatives. However, social factors would be more heavily weighted which might provide additional resolution of access and recreation conflicts than the other action alternatives. Individuals and groups interested in resource protection would prefer this alternative over the others given the combination of the special designation of North Fork John Day acquired lands and buffering along fish streams, and since ecological factors are more heavily weighted.

## **Access and Travel Management Effects on Social Groups**

### ***Effects of Alternative 1***

Concerns were expressed during the public involvement process about decreases in the levels of areas open for motorized use. Relative to the action alternatives, more areas would be open for motorized use under the No Action Alternative. While motorized users would prefer this alternative, individuals and groups interested in resource protection, non-motorized uses, and area residents would likely least prefer this alternative. Conflicts between motorized users, area residents, and non-motorized users would remain unresolved. This alternative also would not address concerns that the BLM should provide additional motorized recreation opportunities such as rock-crawling and concentrated OHV use.

### ***Effects Common to All Action Alternatives***

Individuals and groups interested in access and motorized recreation would favor Alternatives 1 or 3 over the other alternatives given higher motorized access opportunities provided under these two alternatives. However, under the action alternatives, travel on interim routes would be subject to future travel management planning, which could increase opportunities for these individuals and groups. Those interested in resource protection and non-motorized uses would likely prefer the action alternatives over existing management; adjustments to the transportation system to provide protection for soils, water quality, wildlife, and other resources could address some of their concerns.

### ***Effects of Alternative 2***

Individuals and groups interested in access and motorized recreation would favor the existing situation over Alternative 2 given higher motorized access opportunities provided under Alternative 1 (existing management). Travel on interim routes would be subject to future travel management planning which could increase opportunities for these individuals and groups. Those interested in resource protection and non-motorized uses would likely prefer this alternative over existing management due to adjustments to the transportation system to provide protection for soils, water quality, wildlife, and other resources.

### **Effects of Alternative 3**

Individuals and groups interested in access and motorized recreation would likely prefer Alternative 3 over all other alternatives given a greater degree of motorized access opportunities.

## **Special Designations Effects on Social Groups**

### **Effects of Alternative 1**

Under Alternative 1, no new areas would be managed for wilderness characteristics, no new ACECs would be established, and no land would be recommended for WSR designation by Congress. Therefore, individuals and groups who give high priority to resource protection would be less likely to support this alternative than the action alternatives. Those interested in less government regulation would likely prefer current management under this alternative given the regulation they associate with these land use designations.

### **Effects Common to All Action Alternatives**

Under the action alternatives, several areas are proposed to be managed for wilderness characteristics, several new ACECs are proposed, and segments of the North Fork John Day River are recommended for congressional designation as WSR. Some individuals and groups interested in resource protection would favor the increase in these management designations since they prefer the increased resource protection they associate with these designations. Some believe designation as a Wild and Scenic River may attract more visitors which could contribute to increased resource damage. Individuals and groups interested in niche market opportunities would similarly favor the action alternatives, as unique area opportunities are enhanced under the John Day Paleontological ACEC or designation of Wild and Scenic River.

Concerns with possible Wild and Scenic River designation were frequently raised during the public involvement process. Area residents were often concerned about impacts of allowable uses on private property and the increased use and associated impacts to river resources. Designation would not impact allowable uses on private property, and increased use along the river would be managed to protect resources and minimize conflicts.

### **Effects of Alternative 2**

The recommendation of more land under Alternative 2 than Alternative 1 for Wild and Scenic River designation by Congress would likely be preferred by those interested in resource protection. However, individuals and groups interested in less government regulation would likely prefer Alternative 1 given the additional regulation they associate with these area designations.

## **Fire Suppression Effects on Social Groups**

### **Effects of Alternative 2**

Concerns from ranchers and area residents about fire suppression would be addressed under Alternative 2. Under existing management and the action alternatives, there would be 2,300 acres of prescribed fire for treatment of fuels to increase public safety and address resource concerns. Most local residents want fire to be fought as aggressively as possible to protect private property. Under the No Action Alternative, there is no direction for the WUI. Under the action alternatives, prescribed fire in the WUI would be used only for burning piles or broadcast burning in smaller areas where smoke and risk could be managed at acceptable levels. The RMP would tier to the National Fire Plan (USDA *et al.* 2000), which emphasizes the need to reduce hazardous fuels that pose a threat to Communities at Risk. In addition, vegetation management objectives (see Chapter 2) would manage vegetation and fuel loading to trend FRCC towards a condition class less prone to hazardous fire events. Ranchers and area residents would in large part favor the action alternatives over Alternative 1 given this new direction that addresses risk to public safety and resources.

## **Agricultural Land Management Effects on Social Groups**

### **Effects of Alternative 2**

If existing management were fully implemented, only 180 acres would be leased. The action alternatives allow up to 400 acres of BLM-managed agricultural lands to be leased. The action alternatives would increase the spatial distribution and acreage available for agricultural leases by a small amount.

There are only slight difference in effects to prime farmlands between agricultural land management under Alternative 1 and the action alternatives. Agricultural land management under Alternative 2 and the other action alternatives places more emphasis on allowing fields along rivers to function as floodplains rather than protecting them from flooding. This would improve riparian condition and refresh nutrients important for crops, thereby improving the market value of agricultural land and non-market values given the resource protection many associate with improved riparian condition.

## **Resource Uses Effects on Social Groups**

### ***Effects of Alternative 1***

A number of individuals and groups expressed concern about limitations being placed on the availability of public lands for commercial uses such as livestock grazing, mineral development, and forest products. Some comments requested that the RMP focus on beneficial economic and social use of public lands, not locking them up from commercial uses or public access. The current levels, methods, and mix of multiple-use management would continue under this alternative, thus individuals and groups interested in resource use would likely favor this alternative.

## **Effects on Tribal Treaty Rights**

### ***Effects Common to All Action Alternatives***

Under the action alternatives, the BLM would manage vegetation within the acceptable range of variability, and would thus manage for diverse plant communities that contain healthy populations of a variety of native species. Enhancement of wildlife habitat and native plant communities provides increases in opportunity for tribal members to exercise tribal treaty rights such as hunting, fishing, and gathering on public lands. Consultation with tribes will increase communication and coordination for mutually beneficial resource management.

## **Effects to Disabled Users**

### ***Effects Common to All Alternatives***

Under all alternatives, individuals with disabilities could request a permit to travel on closed roads consistent with the Rehabilitation Act of 1973. Such access would be considered on a case-by-case basis by the Prineville District Office.

## **Effects on Environmental Justice**

### ***Effects Common to All Alternatives***

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations. The Order further stipulates that agencies conduct their programs and activities in a manner that does not have the effect of excluding persons from participation in, denying persons the benefits of, or subjecting persons to discrimination because of their race, color, or national origin.

None of the proposed alternatives would be expected to have disproportionately high and adverse human health or environmental effects on minority and low income populations. All alternatives are expected to result in increases in employment and labor income over the next decade, which could benefit these populations but would remain a small share of total employment and labor income within the eight counties that comprise the plan area. Public involvement efforts for this project have been inclusive, and the BLM has considered input from persons or groups regardless of race, color, national origin, income, or other social and economic characteristics.

## **Cumulative Effects to Social and Economic Conditions**

By 2016, non-farm related employment in Gilliam, Jefferson, Morrow, Sherman, Umatilla, Wasco, and Wheeler counties is projected to increase by 12 percent. In the Grant, Harney, and Malheur county region, non-farm related employment is projected to increase by 11 percent (OLMIS 2007). In these same two regions, the population is projected to increase by 13 and 8 percent, respectively, by 2015 (State of Oregon DAS, 2007). These numbers might infer a few things about employment and changes in the labor force. If population increases are outpaced

by employment increases, there could be more retirees and unemployed moving into the area, or the aging labor force would not be replenished with younger workers.

This assertion is reflected in population projections by age groups provided by the Oregon Office of Economic Analysis. Between 2005 and 2015, the retirement age population (ages 65+) in the Gilliam, Jefferson, Morrow, Sherman, Umatilla, Wasco, and Wheeler county area is anticipated to increase by 37 percent, whereas ages that make up the labor force (ages 20 to 64) are expected to increase by 24 percent. Similarly in Grant, Harney, and Malheur counties, the retirement population and labor force are expected to change by 18 and 10 percent, respectively.

When the geographic area of interest is focused on just those counties completely contained within the plan area (Gilliam, Grant, and Wheeler counties), information on projections by age groups provides insight on how retirees, the labor force, and the younger age groups will change as a share of total population. Retirees will make up 19 percent of the total population in 2005 and increase to 22 percent by 2015. The labor force population made up approximately 56 percent of the total population in 2005 and will change to 57 percent by 2015. In 2005 youth and young adults (aged 10 to 24) made up 19 percent of the population, while they are projected to comprise only 15 percent in 2015. These changes reflect trends seen in existing demographic data; the younger generation is moving out as the population continues to age.

Wood products are an important part of the economy and lifestyles within the plan area. As discussed in Chapter 3, the BLM forest product harvests have comprised a small, but increasing, share of the total volume harvested in the area. This is due in large part to decreased harvests on national forests throughout the region. If current trends continue, the BLM harvest could continue to provide a small yet important part of total forest products to the area. Declines in lumber prices connected to larger national and international trends may put pressure on mills and logging operations to further slim operations. Niche markets for specialized forest products may become increasingly important.

Interest in niche markets was frequently mentioned during the public involvement process. In addition to forest products, organic beef and wind energy development are expanding in the plan area. Further investment in organic beef will occur with installation of a slaughtering facility in Grant County that will employ more than 20 people. Wind energy development on BLM land in the plan area may occur, but is highly speculative. Predicting the investment and development in other niche markets is similarly conjectural. However, the BLM has made every effort to enable future development of niche markets and alternative energy throughout the action alternatives. These projects would add to area employment and labor income while this plan would ensure protection for values not traded in markets such as scenery, biodiversity, and solitude.

In conclusion, employment and demographic changes in the area suggest that trends in social and economic well-being would continue. While employment and labor income contributions from BLM management to area totals are small, the land managed by BLM sustains area well-being and would continue to do so under all alternatives. This occurs largely through the provision of natural amenities and recreational opportunities that attract tourists and businesses and maintain the quality of life. None of the alternatives would alter the trends outlined above, but would provide opportunities for value-added businesses in niche markets, support recreational opportunities for a variety of demographic groups, and sustain quality of life for area residents and tourists who value the area.